Advant® OCS
with Master software

Advant Operator Workplace,
AdvaCommand for Windows NT
Version 1.7/1

Product Guide

3BSE 015 877R201

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Chapter 1 Advant Operator Workplace

Advant Operator Workplace with AdvaCommand for Windows NT[1] represents a new approach to supervision and control of industrial processes. It does not only provide the capability to communicate with the process but also with other computers and systems outside the automation system. This information integration capability makes it possible to view both administrative data and process control data on the operator workplace.

Figure 1-1. Advant Operator Workplace

1.1 Product Benefits

Advant Operator Workplace can be connected to MasterBus 300 control networks, and communicate with Advant Controller 400 Series as well as with Advant Information Management Workplaces.

Advant Operator Workplace complies with the X Window System and the OSF/Motif ® standards, making it possible to access and run applications in other stations throughout the network. For instance, to look up circuit drawings created and stored in an engineering station or view and edit data in product quality and business information systems.

Operator Interaction

Operator interaction by means of Human Machine Interface, HMI, equipment, ranging from low-cost to advanced operator workplaces featuring the latest technology in user interfacing, that is, high-resolution color graphics and windowing based on industry standards, such as X Window System and OSF/Motif.

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[1] Advant Operator Workplace in this Product Guide stands for Advant Operator Workplace with AdvaCommand for NT.

1.2 Features

- High resolution displays for presentation of process data.
- Trend presentation of historical data.
- Command entry to the process via mouse and keyboard.
- Process alarms and events are time-tagged and presented for the operator in alarm and event lists and can also be announced audible to make the operator aware of it.
- Event messages and alarms can be grouped and gated in multitude of ways, ensuring that only relevant and primary events are brought to the operator’s attention.
- System status displays provides status information about the automation system with regards to all communication links, stations, peripheral equipment and process I/O boards.
- Process sectioning provides functions for dividing the process into sections and linking each workplace to the desired mix of process sections for supervision and control.
- Status lists is a list of process signals and objects matching search parameters supplied by the operator. Status lists are used to find process objects that are in a certain state or have something in common, for example, all blocked PID objects.
- Display Builder supports the creation of free-image displays for interactive monitoring and control.
- Station Backup function is used to backup applications in the own station.
- On-line Builder. Process controllers can be configured, debugged and documented on-line from a window in the operator workplace.

Chapter 2 Configuration Examples

AdvaCommand for Windows NT is a member of the Advant OCS family. An example on its position in a system configuration is shown in Figure 2-1.

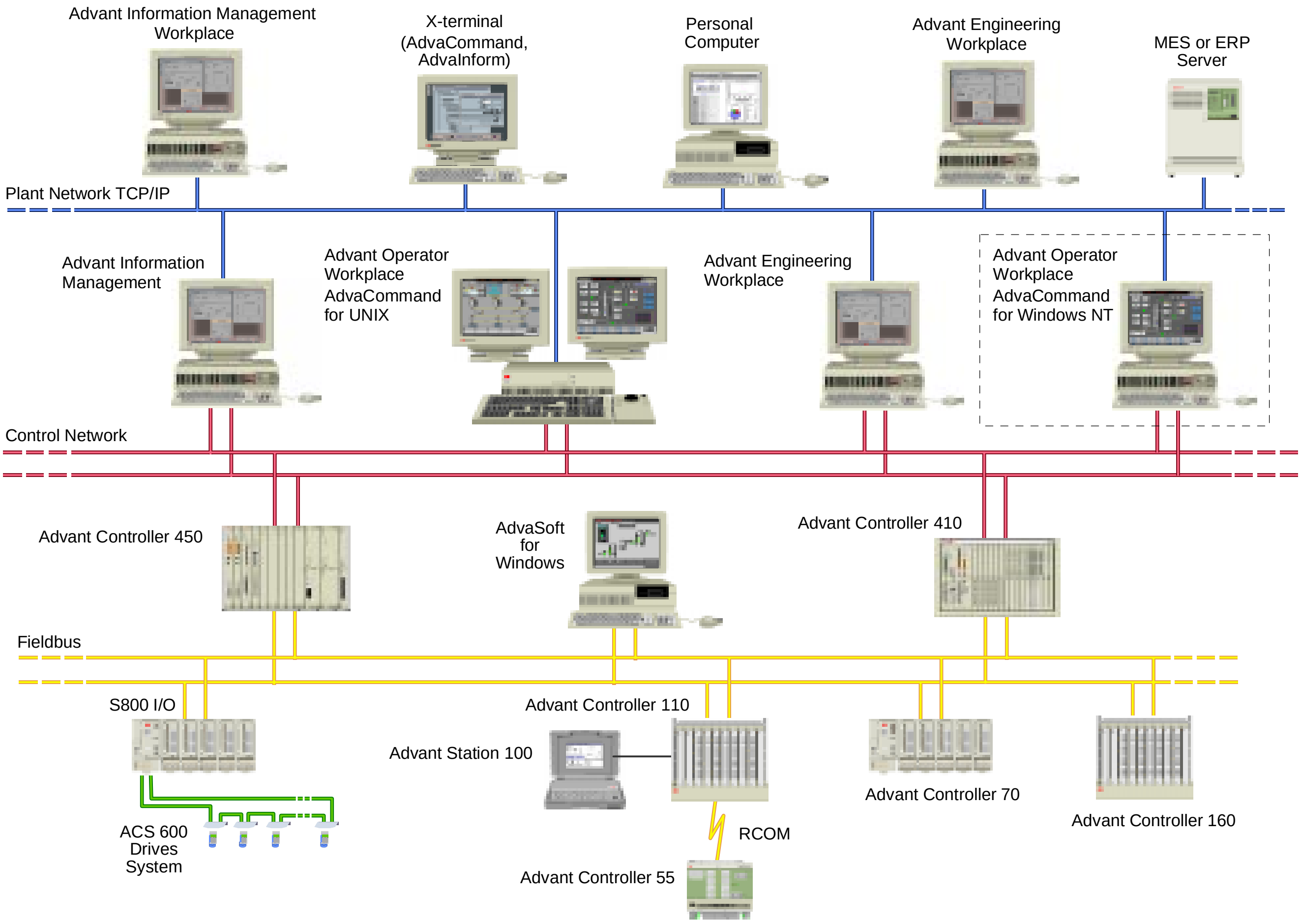


Figure 2-1. Configuration example of an Advant Operator Workplace -AdvaCommand for Windows NT- in an Advant OCS

Chapter 3 Functional Overview

Advant OCS equipment is characterized by extreme reliability and availability and designed to work in industrial environments. However, despite all reasonable precautions, malfunctions can occur. That is why the system parts and functions are monitored automatically and continuously and any faults or problems reported.

AdvaCommand for Windows NT is the software for creating an operator workplace with PC hardware. It contains everything for creating a full-fledged operator workplace. All options are available and can easily be included if the option is bought and the license is obtained.

Table 3-1. Software Components for AdvaCommand for Windows NT

Software Component	AdvaCommand
AdvaCommand User Interface and Manual Control	yes
AdvaCommand Event & Alarm	yes
AdvaCommand Group Alarm	yes
AdvaCommand Trend	yes
AdvaCommand System Status	yes
AdvaCommand Display Transfer	yes
AdvaCommand NLS (Native Language Support)	yes
AdvaCommand Process Sectioning	option
AdvaCommand Status List	option
AdvaCommand Safeguard	option
AdvaCommand for Drive Integration	option
AdvaCommand for Switchgear Integration	option
AdvaBuild Display Builder	option
AdvaBuild On-line Builder	option

3.1 AdvaCommand User Interface

AdvaCommand User Interface, for operator interaction with the process, can pack a large amount of information into a single screen without impairing legibility.

The operator interacts with the automation system by using the mouse, a popup key menu and the standard QWERTY keyboard. The moment a process object has been selected for control, exclusive access is guaranteed and no other operator can interact.

The AdvaCommand User Interface supports different user categories by offering several dialog styles, which are adapted to the different users and their needs, for example, menus for configuration and dynamic function keys for process control.

3.2 AdvaCommand Alarm and Event

The conceptual idea of alarms and events is that they warn the operator when something significant happens in the process and production. The events or alarms triggered, can span from trivial messages to warning of serious process behavior. Alarm and event messages are created as a result of a detection in the process handling, an action from the operator or as a result from an application.

The AdvaCommand Alarm and Event function displays the latest alarm at the top of the screen, no matter which display is up. From this alarm line, the troubled object can be selected for direct inspection and control. The alarm list can be chosen to examine the previous alarms. The alarm can also be announced audibly to the operator.

Process alarms and events are time-tagged in the controller as closely as possible to the source for best possible timing accuracy.

Alarm and Event Lists

Alarm and event messages are stored and presented in chronological lists. The list of events is circular and when the list is full, the next event will overwrite the oldest.

Group Alarm

The group alarm function facilitates filtering of alarms and division of the process into groups of interrelated process signals and objects. The group is seen and processed as one alarm object. Although the group alarm function is flexible and can be used in a variety of ways, its main purpose is to suppress secondary and consequential alarms so the primary ones stand out clearly.

3.3 Adva Command Trend

Trend displays can be used to display data in trace form. Traces with data from different data sources can be mixed in the same display. Data sources, that is, time tagged data (TTD) can originate in both Advant Controllers as TTD based logs and in information management workplaces as history logs.

In the trend display a lot of information is presented. In the trace diagram area the traces are presented and below the trace table, is where all the trace data and configurables are presented. The configurables presented in the trace table are the selected source, object name or log name with description, attribute, treatment, unit and presentation form. The trace data are ruler time and value, the latest received log value, filter factor and time offset.

3.4 AdvaCommand System Status

System Status provides status information about the automation system, with regard to all communication links, stations, peripheral equipment, and process I/O.

System Status presents the status of the automation system on system status displays, with regard to communication links and nodes, including all peripheral equipment and process I/O interface boards/units. The displays are updated cyclically, thus containing real-time information.

3.5 AdvaCommand Process Sectioning

AdvaCommand Process Sectioning is a means to define the command authority and alarm notification of each workplace. It provides functions for dividing the process into sections and linking each workplace to the desired mix of process sections for supervision and control. For each workplace, a number of authority levels can be preset and quickly invoked, depending on the situation.

3.6 AdvaCommand Status List

A Status List is a list of process signals and objects matching search parameters supplied by the operator. Consequently, status lists are used to find those objects that are in a certain state or have something in common.

There are lists for both temporary use -with new search keys every time- and for recurring use -with permanent search keys.

3.7 AdvaBuild Display Builder

AdvaBuild Display Builder is a menu-driven tool for the creation of graphical displays for process supervision and control via AdvaCommand User Interface. Display Builder’s true image presentation of the ongoing work, its powerful features and its intuitive style of operation makes display creation efficient and productive.

The Display Builder is based on the principle WYSIWYG (What You See Is What You Get). Menu bars with pull down menus, palettes, and dialog boxes, sometimes with option menus, are used.

All displays are built with static graphical information and dynamic graphical objects called display elements. The objects in the process and the system are represented by display elements on the display. New display elements can be created and existing elements can be edited.

3.8 AdvaBuild On-line Builder

AdvaBuild On-line Builder is available as an option for AdvaCommand for Windows NT, using a window towards the target system. The AdvaBuild On-line Builder is similar to the On-line Builder of the Advant Station 130, including partial download of AMPL code.

The AdvaBuild On-line Builder should be used for small and fast modifications. At bulk data handling the AdvaBuild Template Builder or the Function Chart Builder are preferred. The On-line Builder also give the possibility to run manual backup of MasterGate 230/1 nodes.

3.9 AdvaCommand Safeguard

Safeguard is the operator workplace part of the Advant Safety System. It enables the presentation and dialogs for the two specific Advant Safety System objects, Fire and Gas. Advant Safety System is a special developed system for supervision of fire and gas in chemical, oil and gas (COG) plants.

It constitutes a complete safety system with total redundant controllers with special developed I/O system. The application unique objects Fire and Gas have been developed with special I/O.

3.10 AdvaCommand for Drive Integration

The Drive integration in AdvaCommand allows the operator to control and supervise different motor characteristics such as speed, current and torque. It is also possible for the operator to give commands to the Drives, for example, for start, stop and fault reset. The function includes Drive specific object and group display elements and dialogs as well as the possibility to include Drive specific process display element in process displays.

Faults and alarms from the Drive are handled by the AdvaCommand Alarm and Event function in the same way as all other process objects. Speed, current and torque are attributes which can be logged in trend displays.

3.11 AdvaCommand for Switchgear Integration

The Switchgear integration in AdvaCommand allows the operator to control and supervise an INSUM (Intergrated System for User-optimized Motor Management) Motor Controller Unit (MCU) via the LONWORKS Network. The functional unit MOTCONI is used as an interface to the MCU. The MOTCONI functional unit includes MCU specific object and group display elements and dialogs. MOTCONI also have specific process display element for process displays. Warnings, alarms and events from the MCU are handled by the AdvaCommand Alarm and Event function in the same way as all other process objects.

Chapter 4 Functional Description

AdvaCommand is a family of operator control and interaction functions. It provides functions for presentation of process information, command entry, alarm and event handling, system status display, window handling, process sectioning, and status lists.

Table 4-1. Overview of AdvaCommand functions and product series

Function	**AdvaCommand for Windows NT**	**AC 400 Series**	**AdvaCommand for UNIX**	**AdvaInform**
AdvaCommand User Interface and Manual Control	yes	- (1)	yes	- (1)
AdvaCommand Alarm and Event	yes	partly (2)	yes	partly (3)
AdvaCommand Group Alarm	yes	partly (4)	yes	
AdvaCommand Trend	yes	partly (5)	yes	partly (5)
AdvaCommand System Status	yes	partly (6)	yes	partly
AdvaCommand Display Transfer	yes		yes	
AdvaCommand NLS (Native Language Support)	yes		yes	
AdvaCommand Process Sectioning	option	-	option	-
AdvaCommand Status List	option	-	option	-
AdvaCommand Safeguard	option	option	option	
AdvaCommand for Drive Integration	option	option	option	
AdvaCommand for Switchgear Integration	option	option	option	
AdvaBuild Display Builder	option		option	
AdvaBuild On-line Builder	option		option	

(1) Data to present in the displays are available in, for example, the Advant Controller 400 Series and AdvaInform and subscribed to by the AdvaCommand User Interface at presentation.

(2) Group alarm objects can be located in Advant Controller 400 Series or in AdvaCommand.

(3) Alarms and events generated in AdvaInform are distributed to the operator workplaces, but are also stored in -and presented in lists on- the information management workplace screen.

(4) Group alarm objects can be located in Advant Controller 400 Series and Advant Operator Workplaces.

(5) The logs for collecting time tagged data is located in the Advant Controller 400 Series and Information Management Workplaces.

(6) The System status function has software running in Advant Controller 400 Series, Information Management Workplaces and AdvaCommand ver. 1.7 for Windows NT. The distributed software reports current status on request from the AdvaCommand System Status function at presentation.

4.1 AdvaCommand for Windows NT

AdvaCommand for Windows NT software is intended for use in a standard PC (Personal Computer). It can be equipped with a real-time accelerator board, including an optionally redundant interface to MasterBus 300/300E.

Figure 4-1. PC with AdvaCommand for Windows NT

Each station forms one workplace. A workplace has one monitor, a standard QWERTY keyboard, and a mouse. The work is carried out with the QWERTY part on the standard keyboard and pop-up keyboard menu on the screen handled with the mouse.

A workplace consist of a PC system unit, to which a number of hardware options can be added. The AdvaCommand for Windows NT software consist of a basic operator functionality to which a number of options can be added. The Advant Operator Workplace provides high-performance human-machine communication in the Advant OCS process automation system. The user interface is based on the OSF/Motif standard.

The basic functions include:

- Display of live process information on fully graphic screen in full color
- Access to external systems through support for X Window System
- Overriding, operator intervention in the process and manual control
- Intelligent alarm and event processing and presentation
- Real-time display of system status and error information
- Alarm filtering by grouping of alarms
- Sophisticated trend functionality.

Options include:

- Process sectioning and operator authority checking
- Status lists, enabling searching through the process database with many different search keys
- Tools for display creation
- Integral functionality for on-line programming of the control system
- External alarm, hardware option based on an audio card in the PC, or digital outputs in an Advant Controller
- Packaging, cabinets and operator tables.

The operator communicates with the system and the process through color-graphic video display units, mouse, keyboard and printers. The mouse is used to point and select displays to be called up, process device to be controlled, report to be printed, etc., resulting in convenience and intuitive operation in industrial process control. The operator workplace can also supervise process areas beyond the own control network via MasterGate 230/1 communication stations. The operator workplace communicates with the rest of the Advant OCS system over MasterNet, the communications network of the Advant OCS.

A mix of up to 32 operator and information management workplaces and MasterGate 230/1 can be connected to a control network (direct or indirect). Up to 16 operator workplaces (including X-workplaces) can simultaneously have the same kind of objects selected in the same node.

The process data is distributed across the controllers of the Advant OCS. No mirroring of process data takes place in the operator workplaces. This reduces the overall need for data storage and ensures fast display updating and command propagation by reducing the load on the communications network and ensuring data currency. An operator workplace can form a part of an area control system, as shown in Figure 4-2:

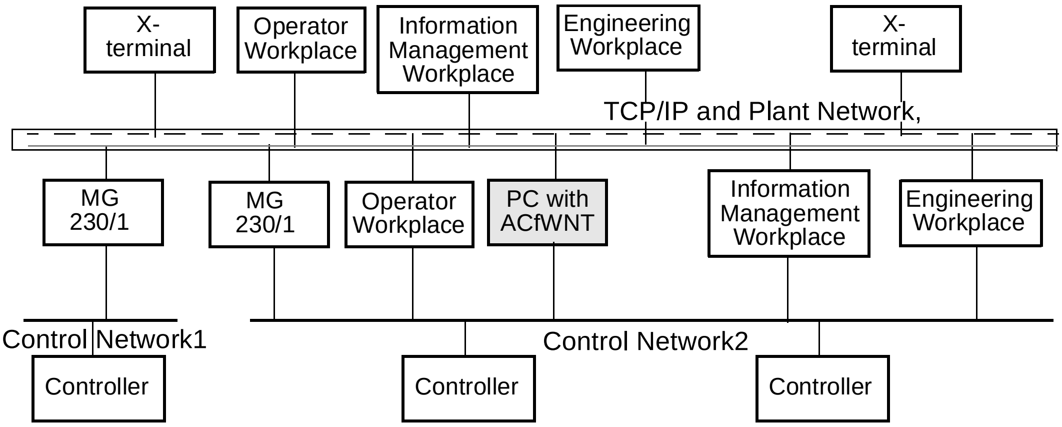


Figure 4-2. System topology

The Advant Operator Workplace, with AdvaCommand for Windows NT, can only be used as an operator workplace on a control network, with high performance control and presentation within the control network.

X Windows towards Other Nodes

The Advant Operator Workplace is open in the sense that it supports the X Window System. This means that applications in other computers can be accessed in graphical windows, via TCP/IP, on the operator workplace. This gives a “single window” functionality. The normal way to open X windows to access external applications is via the dynamic keys or the fixed display selection keys in the keyboard pop up menu. Instead of assigning the normal base or overlap display to a fixed display selection key an external application can be started.

Native Language Support

The AdvaCommand for Windows NT software has built-in support for localization. The software can easily be adapted to native language, see the manual *AdvaCommand Localization*.

“Tags” in AdvaCommand

In the Advant Controller, objects can be configured, for example, PIDCON, MOTCON, DI, AO, DAT, TEXT etc. These are given unique symbolic names, for example, "Motor01" for a MOTCON. In AdvaCommand, information from an object can be displayed by a display element. When an object is referenced from a display element in a display, a reference is generated from the display element to the object. This is called a “tag”. If the same object, that is, the same name of the object used, is referenced from several displays by a display element, no new reference is generated. So a unique object referenced from several displays and display elements only uses one “tag”. The number of tags can easily be calculated by counting the number of objects that will be presented, one or several times in the AdvaCommand.

4.2 AdvaCommand User Interface and Manual Control

AdvaCommand User Interface

AdvaCommand User Interface, for operator interaction with the process, can pack a large amount of information into a single screen without impairing legibility.

The operator interacts with the automation system by using the mouse, a popup key menu and the standard QWERTY keyboard. The moment a process object has been selected for control, exclusive access is guaranteed and no other operator can interact.

The AdvaCommand User Interface supports different user categories by offering several dialog styles, which are adapted to the different users and their needs, for example, menus for configuration and dynamic function keys for process control. The screen is divided into areas, each reserved for a specific purpose. The basic screen layout is shown in Figure 4-3.

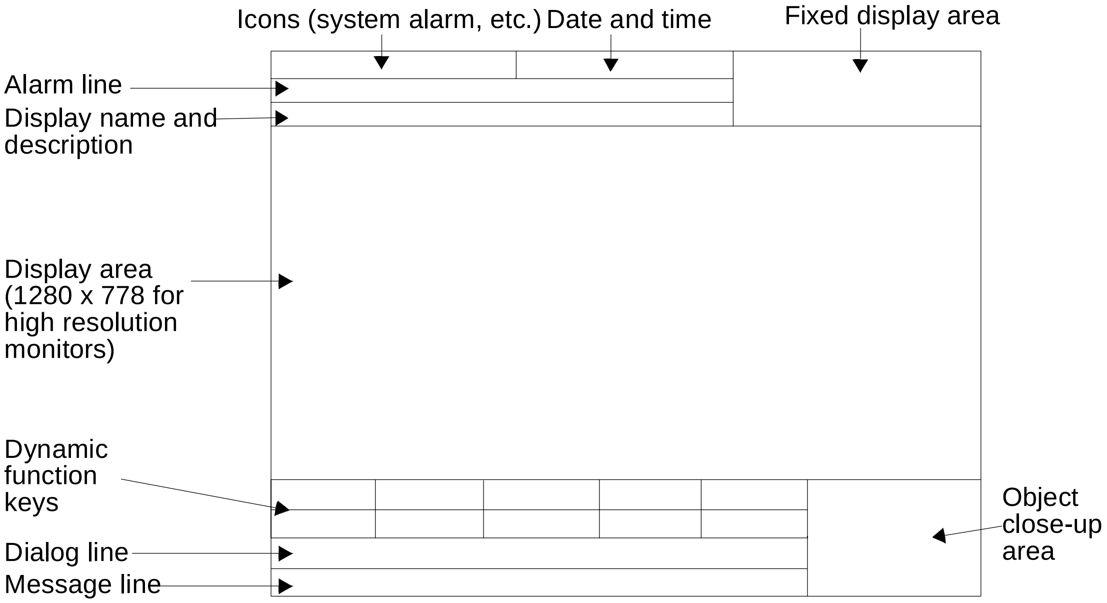

Icons (system alarm, etc.)
Date and time
Fixed display area
Alarm line
Display name and description
Display area (1280 x 778 for high resolution monitors)
Dynamic function keys
Dialog line
Message line
Object close-up area

Figure 4-3. Screen layout

The different screen areas are as follows:

- Icon area contains various icons for indication and selection. The icons include, for example, system alarm, maximum authority, external alarm and dedicated screen buttons.
- Date-and-time field shows current date and time, measured by the internal system clock
- Fixed display area is for continuous presentation of a user-created display, for example, a process overview, a production summary, or an alarm summary
- Alarm line shows the latest unacknowledged process alarm. There is also a list of current process alarms for trouble-shooting in the plant.
- Display-name and description field contains the name and description of the current display. Displays are searched for and accessed by name and the descriptions make it easy to find the right display on menus etc. at all times.
- Display area is where the displays called up appear.
- Dynamic function key field is the main means for operator input of commands both to the system and to the process. Commands are issued by pointing at the desired key with the cursor and clicking a button or by pressing the desired function key on the keyboard.
- Dialog line guide the operator through command sequences by displaying intelligent, situation-sensitive prompting messages.
- Message line supplements the dialog line in guiding the operator by providing additional information, for example, error messages.
- Object close-up area presents detailed information on the process or system object selected for control, thus providing the information the operator needs for the actions ahead without having to call up other displays with more details.

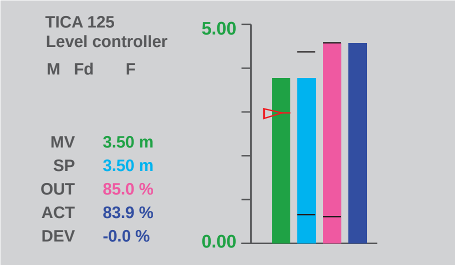
The status of the process is shown on different types of displays:

- Process displays are application-specific displays entirely defined by the user. Values and states of objects, such as regulators, sequences, measurement points, motors, etc., are presented dynamically.
- Overview and group displays offer a cursory view of the different parts of the process. Objects are arranged in groups, corresponding to process areas. The format of these displays is standardized; all that needs to be defined is which objects to show where.
- Object displays present all information available on single objects. They are automatically made available for all the objects in the control system without configuration.
- Alarm and event lists providing records of the latest alarms and events in the process, in the system.
- AdvaCommand User Interface allows access to a vast amount of historical data stored throughout the automation system for presentation of trends, histograms, and tables. They can be presented in separate trend displays, overlapping windows or as part of basic process displays.

  Data for Trend displays can be obtained from any log containing the variable of interest, regardless of where it is located -in the controller or the information management workplace. The logs are then seamless presented in the trend display and can be panned smoothly or in jumps, autoscrolled and feather analyzed by zooming in and out in the presented log data. From the trend display, process objects can be selected for directly control, each presented log data value can be tracked to its source and other features.

  The value-scale can easily be adjusted by the user and the latest value is presented numerically for best accuracy. There is also a ruler which can be slid across the graph for accurate numeric reading at any point, and a lot of other analyze functions.
- Status lists, extracting the process objects matching specified search keys.
- Display printouts.

Different types of displays are shown in the following figures.



TICA 125
Level controller
M Fd F

MV 3.50 m
SP 3.50 m
OUT 85.0 %
ACT 83.9 %
DEV -0.0 %

Figure 4-4. Example of an object close-up display

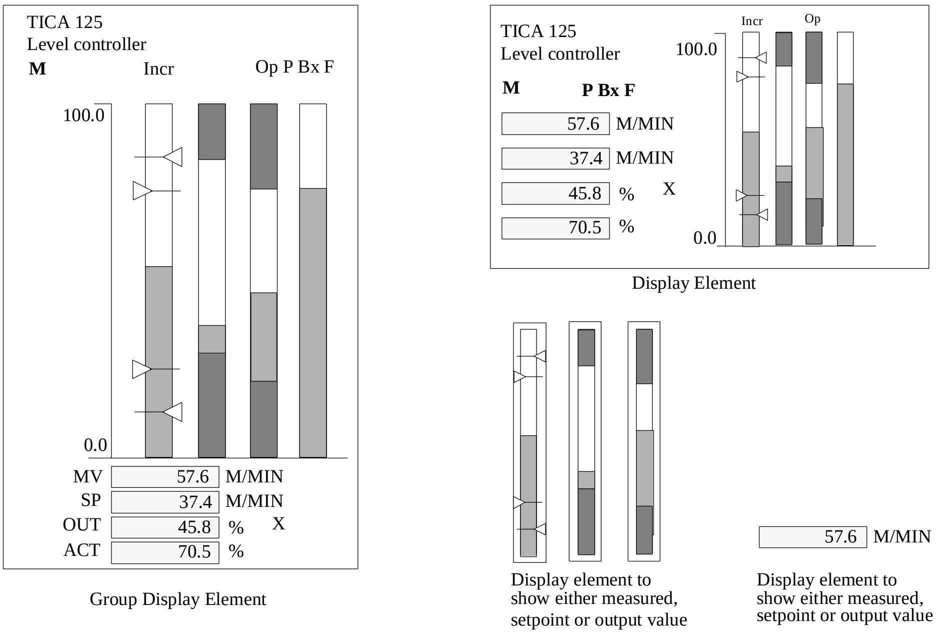


Figure 4-5. Examples of standard object display elements to be utilized in process displays.

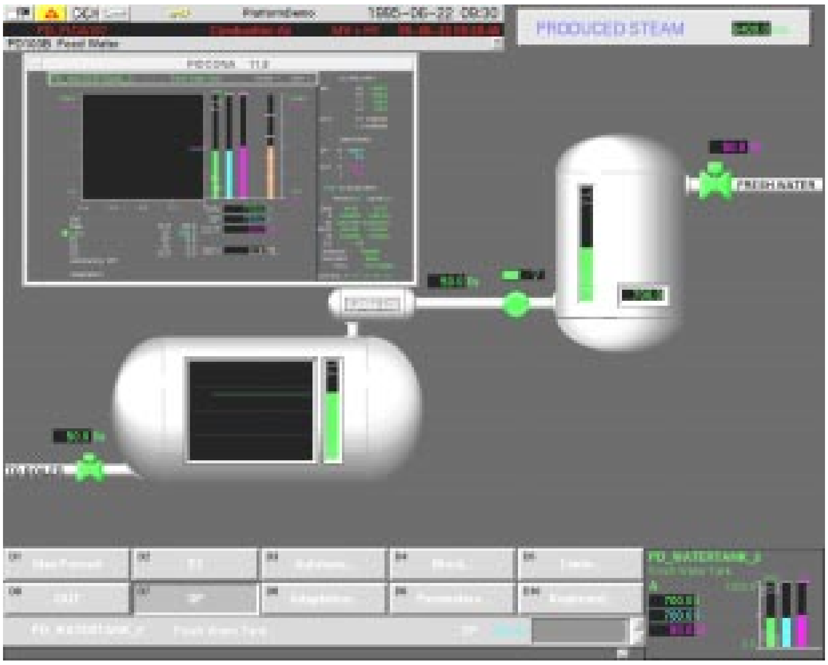


Figure 4-6. Example of a process display with activated object and an object close-up display

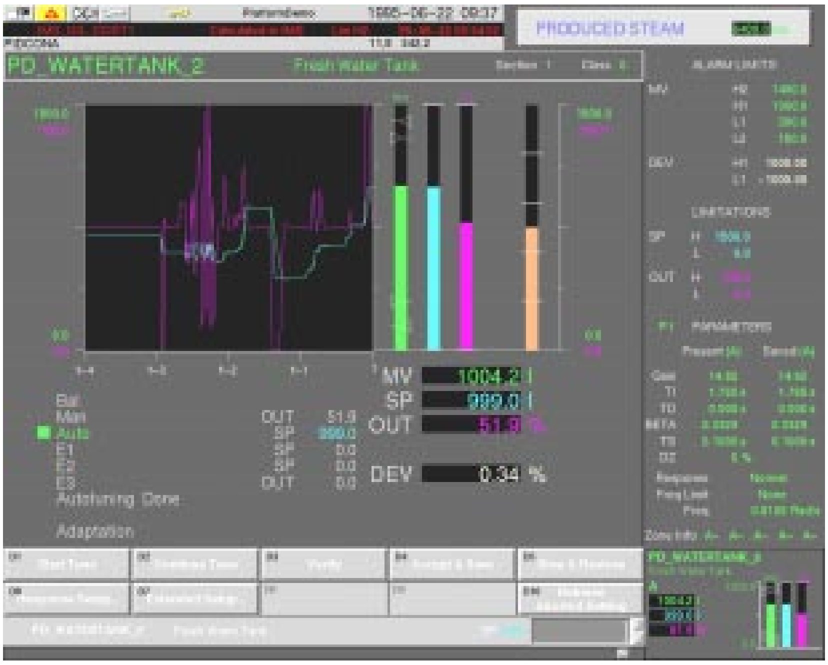


Figure 4-7. Example of an object display

Dynamic data for a display is obtained from the controllers and information management workplaces concerned when the display is called up. The display is then kept updated cyclically or as events occur until it is is closed. The display handling in AdvaCommand Software offers convenient features; base displays, overlapping displays, and pop-up menus, making operator interaction effective and efficient.

- A base display covers the whole display area. It always removes and closes all other displays in the display area before being presented. The size of base displays is fixed.
- An overlapping display is presented on top of the current displays, without affecting them in other ways. Overlapping displays can be moved, resized, and closed.

Several displays can be presented simultaneously on the screen, that is, one base display and one or several overlapping displays can be viewed at the same time. All predefined system displays by AdvaCommand User Interface are normally called up as base displays. If required, some system displays can also be called up as overlapping. This is useful, for example, when the operator wants to look at a selected object display while still keeping an eye on the process.

The support for X Window system means that windows can also be opened on the operator workplace screen, for interaction with applications in other operator, information management, and engineering workplaces as well as in external computers on the plant network.

For each display, one forward and one backward link can be defined for chaining of displays. Displays can also be configured hierarchically. The display hierarchy and display chains are totally user-definable.

Both base and overlapping displays are normally presented on operator request. Several ways for display selection are offered:

- From the display selection menu, where it is also possible to distinguish overlapping displays from base displays. The menus can be defined as hierarchical if desired.
- Fixed keys in a popup display selection menu can be used to call up frequently used displays. It is possible to use fixed keys for both user-defined and fixed system displays.
- In each process display the dynamic function keys can be configured to be links to other displays.
- A display can be called up for presentation by using the display request command key and then entering the display name.
- The paging keys, Previous Display, Page Left and Page Right enable the operator to recall previous presented display and page between chained displays. The Page Left and Page Right keys are also used for paging through a list or a display consisting several pages.
- Display links. Display elements in the display area can point at other displays. When an element is selected, the associated display is presented.

Manual Control

The operator can, provided he has the right authority, select any object for manual control. Selection gives the operator exclusive access to this object for the duration of the dialog sequence, that is, no other operator can intervene in this dialog. All other operators can of course view the object. After having engaged an object in this way, the object must be released, either explicitly (by cancelling the selection), implicitly (by selecting another object or base display), or automatically (after expiry of a certain time-out).

Process objects can be selected in a number of ways by:

- Pointing at the symbol of the object on the display
- Entering the name of the object
- Selecting the object presented on the alarm line
- Using the key; “Previous Object”
- Selecting the object presented in the Alarm List or Event List
- Selecting the object presented in the Status List.

Selection of an object is confirmed by the symbol of the object on the screen becoming highlighted. The name, status, and value of the object are presented in the information area and the dialog commands available for the object are presented in the dynamic function key area. If enabled, the object close-up display will also appear. The object can also be selected and controlled by a pop-up menu, that can be achieved by marking the object and clicking the right mouse button.

A process object is assigned a symbolic name, called tag, in the Advant OCS. The symbolic name is used to establish communication with other objects. An object can reside in any Advant OCS node. The tag, or object is resolved in the object reference list. An object referred to from several displays only occupy one tag. The number of resolved tags can be found by using the Object Reference tool.

By putting the pointer on the symbol of a process object, the object is marked and the user can request additional information about the object or select it. Marking itself does not enable control of the object. Marking of process objects is possible on process displays and on lists. A marked object is indicated by the corners of an otherwise invisible rectangle surrounding the object.

If the optional function Process Sectioning is included in the system, authority checking can be applied to object selection, preventing tampering with objects outside the operator's area of authority.

4.3 AdvaCommand Alarm and Event

The conceptual idea of alarms and events is that they warn the operator when something significant happens in the process and production. The events or alarms triggered, can span from trivial messages to warning of serious process behavior. Alarm and event messages are created as a result of a detection in the process handling, an action from the operator or as a result from an application.

The alarms and events are generated in Advant Controller 100 Series and Advant Controller 400 Series as well as in Advant Information Management Workplace.

Alarms and events from Advant Controller 100 Series are transferred via Advant Controller 400 Series, if configured for that.

The AdvaCommand Alarm and Event function displays the latest alarm at the top of the screen, no matter which display is up. From this alarm line, the troubled object can be selected for inspection and control directly. Or the alarm list can be chosen to examine the previous alarms. The alarm can also be announced audibly to make the operator aware of it.

Process alarms and events are time-tagged in the controller as closely as possible to the source for best possible timing accuracy.

Event messages and alarms can be grouped and gated in a multitude of ways, to ensuring that only relevant and primary events are brought to the operator's attention.

Alarm and Event Lists

Alarm and event messages are stored and presented in chronological lists. The list of events is circular and when the list is full, the next event will overwrite the oldest. An alarm is a special type of event, requiring operator attention and acknowledgment. While events are generated whenever predefined conditions are met, for example, binary variables change state or analog values exceed limits, alarms are generated when abnormal events occur. By default, an alarm is not removed from the list until the operator has acknowledged the alarm and the error has disappeared. However, it is possible to configure the function in such a way that the message disappears after acknowledgment, even if the alarm condition still exists.

Alarms are also indicated on all displays as a latest unacknowledged alarm line, and as status indications with red color in displays with dynamic data from the objects concerned, flashing until the alarm is acknowledged, and then steady as long as the alarm condition persists.

It is also possible to configure objects for repetition control of alarms, which means that repetitive reporting of the same alarm is suppressed if the object toggles between the normal and faulty states.

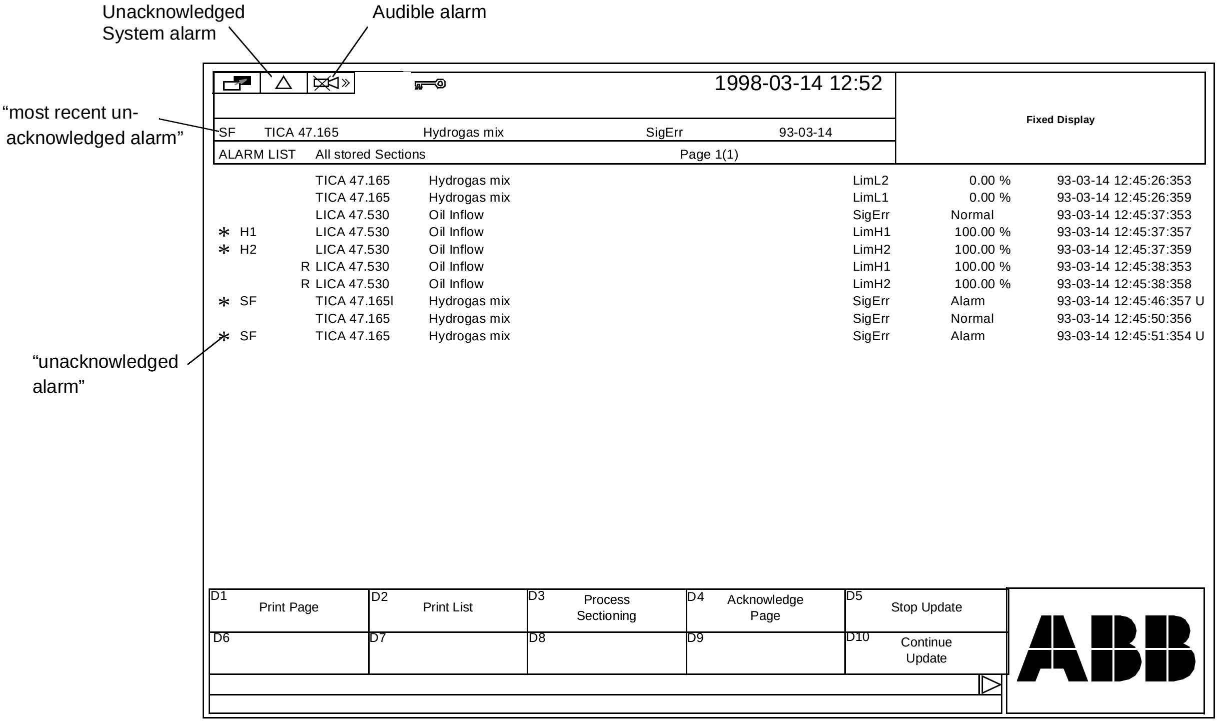
On operator request, the alarm and event messages can be presented in different types of lists. The following lists are available:

- Process event list
- Process alarm list
- System list

The system list contains messages of control system errors, indicating faults or other changes of state in the control system.

By setting the pointer on an alarm in the alarm or event list an alarmed object can be selected or marked for presentation of concerned object display.

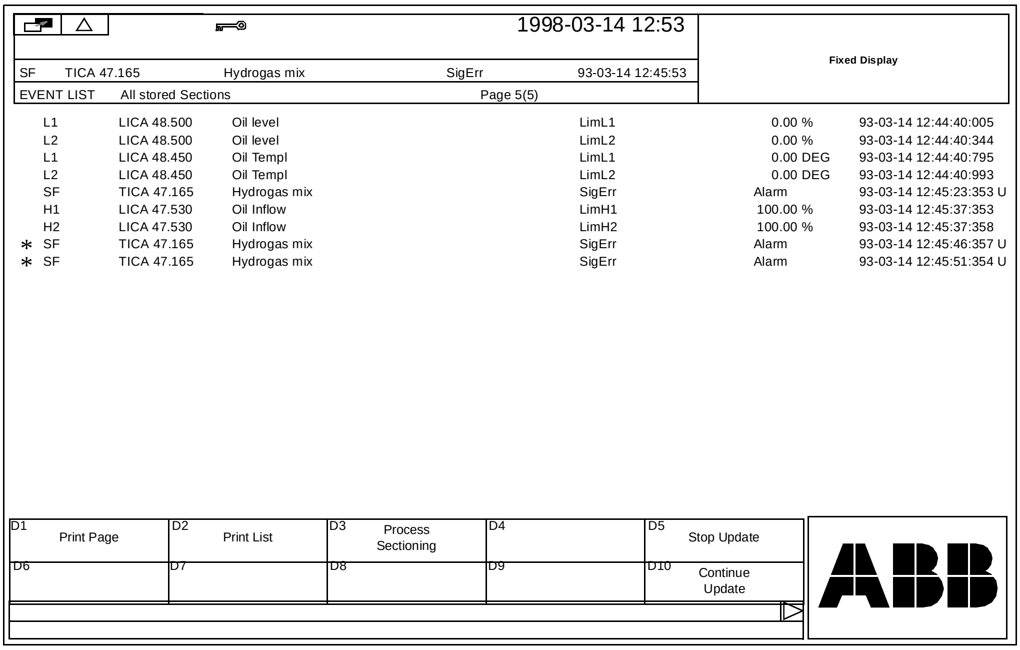
All three lists can be printed on request, when the alarms and events occur.



```
                                                          1998-03-14 12:52
SF     TICA 47.165          Hydrogas mix          SigErr        93-03-14
ALARM LIST    All stored Sections                    Page 1(1)

             TICA 47.165    Hydrogas mix                      LimL2      0.00 %   93-03-14 12:45:26:353
             TICA 47.165    Hydrogas mix                      LimL1      0.00 %   93-03-14 12:45:26:359
             LICA 47.530    Oil Inflow                        SigErr    Normal    93-03-14 12:45:37:353
 *  H1       LICA 47.530    Oil Inflow                        LimH1    100.00 %   93-03-14 12:45:37:357
 *  H2       LICA 47.530    Oil Inflow                        LimH2    100.00 %   93-03-14 12:45:37:359
           R LICA 47.530    Oil Inflow                        LimH1    100.00 %   93-03-14 12:45:38:353
           R LICA 47.530    Oil Inflow                        LimH2    100.00 %   93-03-14 12:45:38:358
 *  SF       TICA 47.165l   Hydrogas mix                      SigErr    Alarm     93-03-14 12:45:46:357 U
             TICA 47.165    Hydrogas mix                      SigErr    Normal    93-03-14 12:45:50:356
 *  SF       TICA 47.165    Hydrogas mix                      SigErr    Alarm     93-03-14 12:45:51:354 U
```

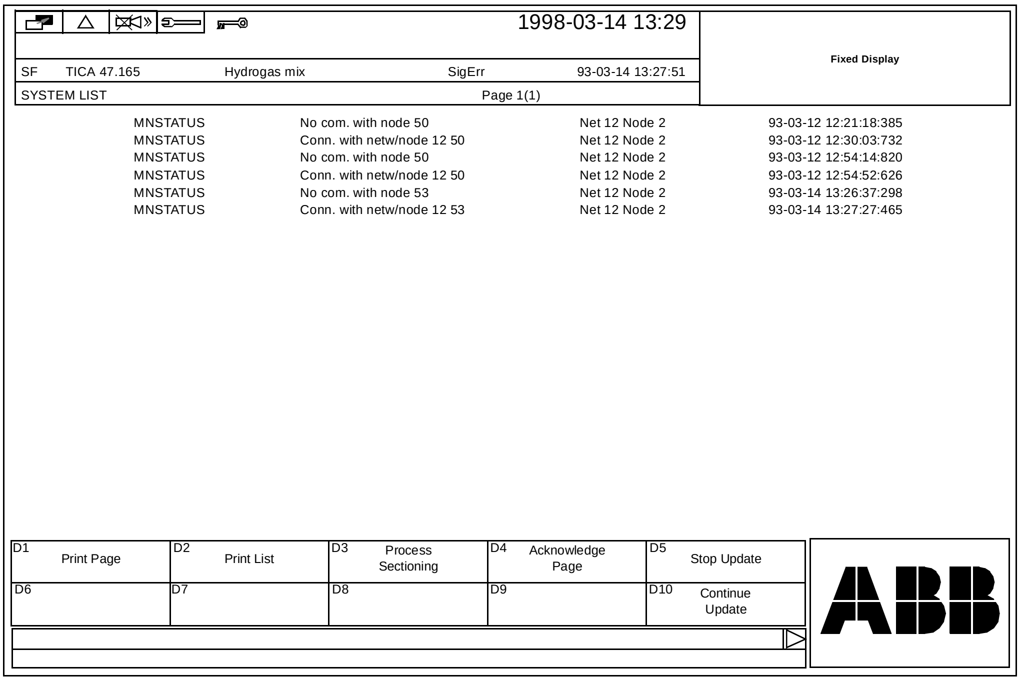
Figure 4-8. An Alarm List example



```
1998-03-14 12:53
SF   TICA 47.165   Hydrogas mix   SigErr   93-03-14 12:45:53
EVENT LIST   All stored Sections   Page 5(5)

   L1   LICA 48.500   Oil level      LimL1     0.00 %     93-03-14 12:44:40:005
   L2   LICA 48.500   Oil level      LimL2     0.00 %     93-03-14 12:44:40:344
   L1   LICA 48.450   Oil Templ      LimL1     0.00 DEG   93-03-14 12:44:40:795
   L2   LICA 48.450   Oil Templ      LimL2     0.00 DEG   93-03-14 12:44:40:993
   SF   TICA 47.165   Hydrogas mix   SigErr   Alarm       93-03-14 12:45:23:353 U
   H1   LICA 47.530   Oil Inflow     LimH1    100.00 %    93-03-14 12:45:37:353
   H2   LICA 47.530   Oil Inflow     LimH2    100.00 %    93-03-14 12:45:37:358
 * SF   TICA 47.165   Hydrogas mix   SigErr   Alarm       93-03-14 12:45:46:357 U
 * SF   TICA 47.165   Hydrogas mix   SigErr   Alarm       93-03-14 12:45:51:354 U
```

Figure 4-9. An Event List example



```
1998-03-14 13:29
SF   TICA 47.165   Hydrogas mix   SigErr   93-03-14 13:27:51
SYSTEM LIST   Page 1(1)

   MNSTATUS   No com. with node 50          Net 12 Node 2   93-03-12 12:21:18:385
   MNSTATUS   Conn. with netw/node 12 50    Net 12 Node 2   93-03-12 12:30:03:732
   MNSTATUS   No com. with node 50          Net 12 Node 2   93-03-12 12:54:14:820
   MNSTATUS   Conn. with netw/node 12 50    Net 12 Node 2   93-03-12 12:54:52:626
   MNSTATUS   No com. with node 53          Net 12 Node 2   93-03-14 13:26:37:298
   MNSTATUS   Conn. with netw/node 12 53    Net 12 Node 2   93-03-14 13:27:27:465
```

Figure 4-10. A System List example

External Alarms

External alarm indication devices; loudspeakers, horns and beacons, can be connected to:

- local audible output, a hardware option to the operator workplace.
- remotely located digital outputs; external alarms can be routed to digital outputs in any controller in the network.

Acoustic alarm is available by an audible card in the Advant Operator Workplace. This alarm can be configured to one of 15 sounds, 5 continuous and 10 momentary. When an unacknowledged alarm exists the loudspeaker outputs the configured sound associated with this alarm type.

The alarm is silenced either by pressing the Silence key or position the cursor on the audible alarm icon and pressing the Select key. The alarm is acknowledged by pressing the acknowledge key.

Group Alarm

The group alarm function facilitates filtering of alarms and division of the process into groups of interrelated process signals and objects. The group is seen and processed as one alarm object. Although the group alarm function is flexible and can be used in a variety of ways, its main purpose is to suppress secondary and consequential alarms so the primary ones stand out clearer.

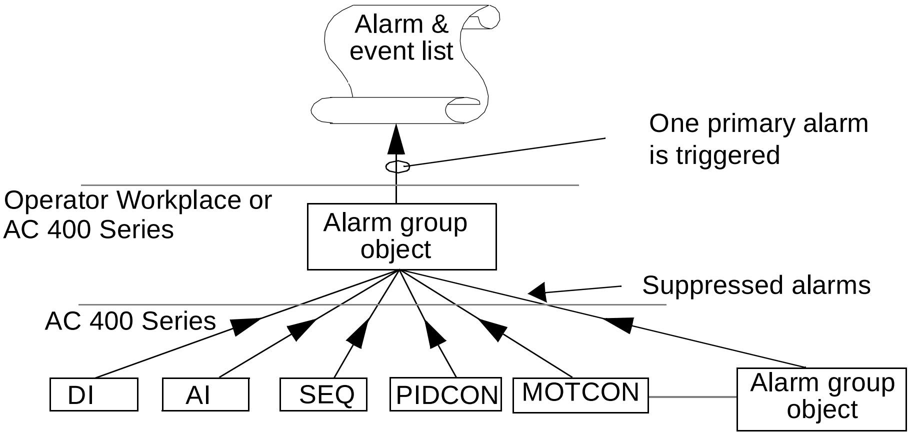


Figure 4-11. The principle of group alarm

Grouping process alarms and events in this way means that the alarm group object changes status when a member object does. In addition, a process alarm or event message is generated by the alarm group object, subject to whatever filtering or blocking functions are defined for the alarm group. Alarm group objects can be located both in controllers and in operator workplaces.

Alarm groups can be configured from the object display of the group. This display is also used for presentation of the current status of the group and its member objects. It is also possible to show the status of the group on process displays, using standard display elements.

The alarm and event processing can be blocked for both the alarm group object and the member objects. Blocking can be imposed either by the operator, an AMPL program, or by a member of the group.

By this, it is possible to suppress consequential and other alarms of minor importance and only report primary/important alarms. The operator can concentrate on the important issues. It is also easy to block alarms from a certain process section, for example, during maintenance.

Auto acknowledgment is available for both the alarm group object and the member objects, meaning that only a single alarm acknowledgment action is required to reset the entire group, regardless of the number of members that may require acknowledgment.

To each alarm group object, it is possible to attach two digital outputs in the host controller, indicating active and unacknowledged alarms respectively. Alarm group objects in an operator workplace can be connected to any digital output in any controller in the control network.

4.4 AdvaCommand Trend

Trend displays are used to display data in trace form. Traces with data from data sources can be mixed in the same display. Data sources, time tagged data (TTD), can originate in both Advant Controllers as TTD based logs and in Information Management Workplaces as history logs.

In the trend display a lot of information is presented. See Figure 4-12. In the trace diagram area the traces are presented and below, the trace table where all trace data and configurables are presented. The configurables presented in the trace table are the selected source, object name or log name with description, attribute, treatment, unit and presentation form.
The trace data are ruler time and value, the latest received log value, filter factor and time offset. There are three types of trend displays, which all can present a number of traces:

- Trend displays are used to present log values emanating in Advant Controllers and information management workplaces. Trend displays can be configured in the AdvaBuild Display Builder and be reconfigured in runtime. The fully runtime configurable trend display can be configured with any number of traces. There are some positioning, trace control and analyze possibilitys available, such as:
  - select and change time scope in runtime
  - move the ruler
  - hide/show traces
  - zooming in and out on traces
  - analyze the traces and verify which logs that are used for data representation.
- Object trend can be used to display time tagged data that comes from an object in a controller. An object trend present the object variables and has the same functionality as a trend display and can be called up for any object without creating a display. The user selects an object and request the object trend function. At this point the system creates a temporary display for the object in question.
- Small trend display elements can be built into a process display to get a quick view of a specific process variable. It is possible to enlarge the process trend element by selecting the element. When selecting a process trend display element an overlap trend display containing the same traces will appear on the screen. This is a system generated trend display (automatic trend) with the same functionality as the trend display.

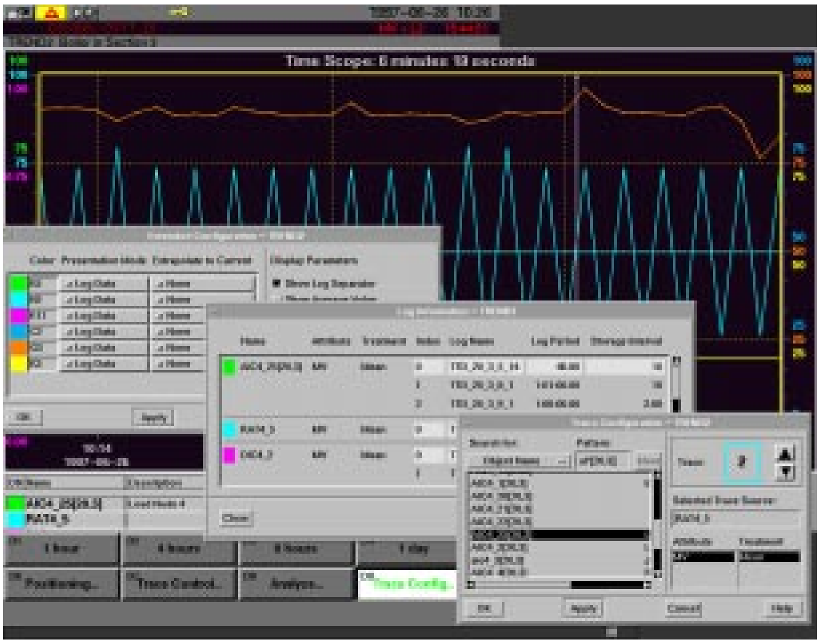
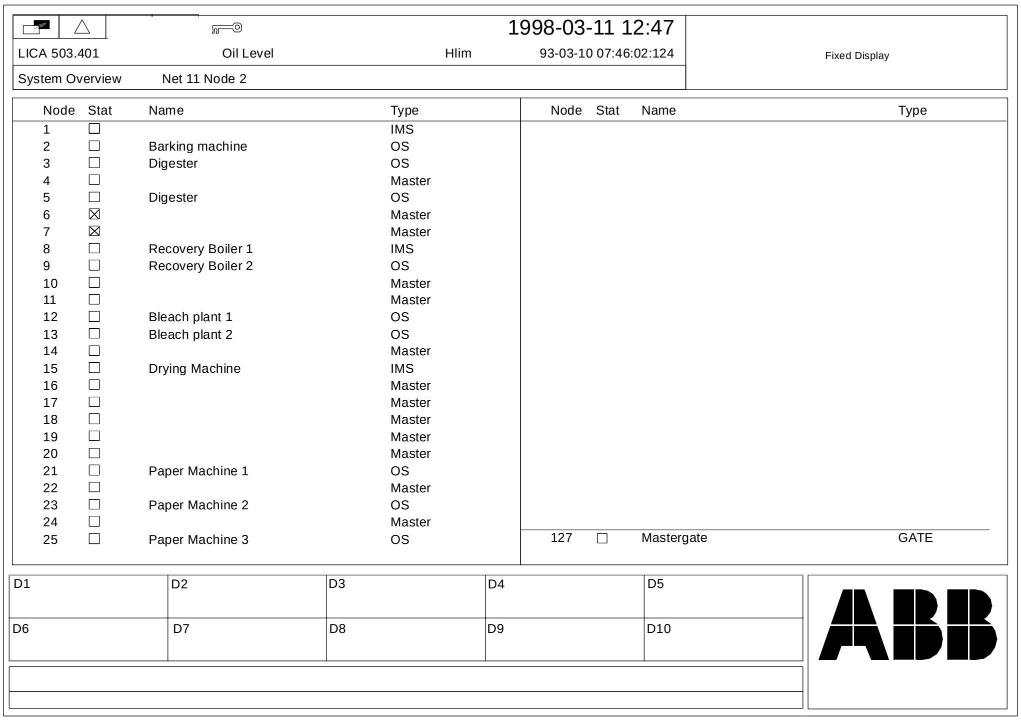


Figure 4-12. Example of a Trend Display

4.5 AdvaCommand System Status

System Status provides status information about the automation system, with regard to all communication links, stations, peripheral equipment, and process I/O.

System Status presents the automation system’s status on system status displays, with regard to communication links and nodes, including all peripheral equipment and process I/O interface boards/units. The displays are updated cyclically, thus containing real-time information.



1998-03-11 12:47

LICA 503.401 Oil Level Hlim 93-03-10 07:46:02:124

Fixed Display

System Overview Net 11 Node 2

Node	Stat	Name	Type
1	☐		IMS
2	☐	Barking machine	OS
3	☐	Digester	OS
4	☐		Master
5	☐	Digester	OS
6	☒		Master
7	☒		Master
8	☐	Recovery Boiler 1	IMS
9	☐	Recovery Boiler 2	OS
10	☐		Master
11	☐		Master
12	☐	Bleach plant 1	OS
13	☐	Bleach plant 2	OS
14	☐		Master
15	☐	Drying Machine	IMS
16	☐		Master
17	☐		Master
18	☐		Master
19	☐		Master
20	☐		Master
21	☐	Paper Machine 1	OS
22	☐		Master
23	☐	Paper Machine 2	OS
24	☐		Master
25	☐	Paper Machine 3	OS

Node	Stat	Name	Type
127	☐	Mastergate	GATE

Figure 4-13. Example of a System Status Overview Display

System status information is extremely useful during installation and commissioning of the control system, especially since the MasterNet is totally self-configuring.

Information about the following is provided:

- System communication links, for example, MasterBus 300
- Node types, for example, workplaces
- Node status
- Peripheral system communication links
- Device status, for example, RTA board, secondary memory, power supply
- I/O board status, both central and distributed I/O

The system status displays are created automatically.

4.6 AdvaCommand Display Transfer

An operator can request importation and presentation of displays that are configured and stored in other Advant Operator Workplace nodes -AdvaCommand for UNIX, ver. 1.7 and later.
A source code copy of the selected display is transferred from the other operator workplace to the requesting operator workplace, where it has to be installed, as any other display, prior to being used.

Displays obtained in this way can be included in any of the available display menus.

4.7 AdvaCommand Process Sectioning

AdvaCommand Process Sectioning is a means to define the command authority and alarm notification of each operator workplace. Its functions can divide the process into sections and link each operator workplace to the desired mix of process sections for supervision and control. For each operator workplace, several authority levels can be preset and quickly invoked.

Each operator workplace can be defined, per section, to have:

- full access
- access with warning message
- no access.

This is applicable to selection of process objects and alarm acknowledgment.

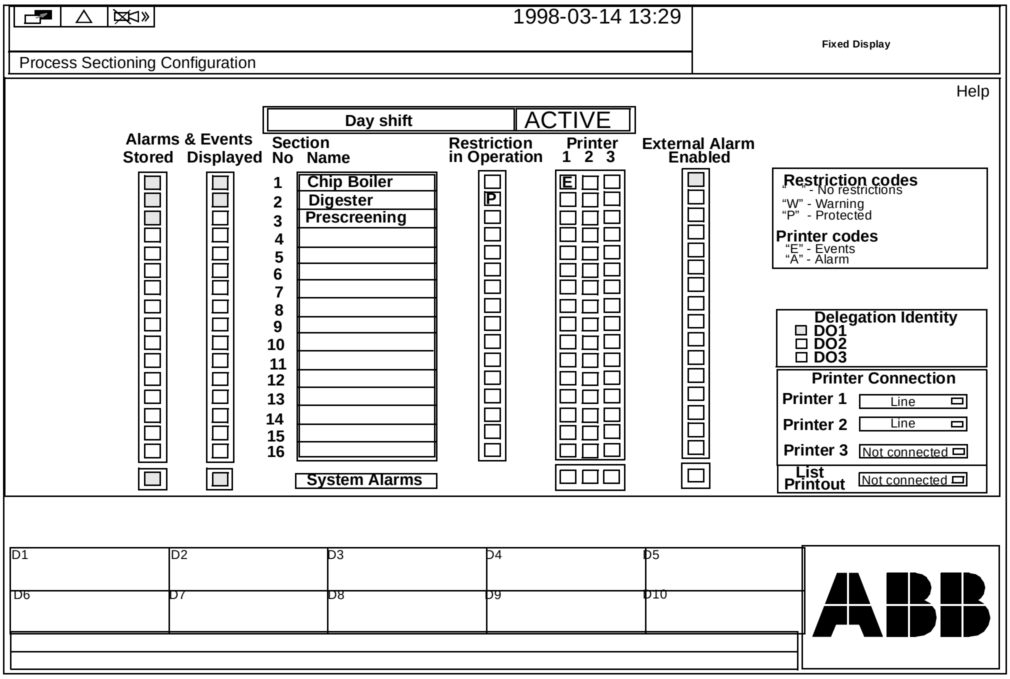
A process may be divided into several sections. Each process object may be allocated to a particular section. On a configuration display for process sectioning, the alarms and events from the different process sections are assigned to the desired operator workplaces. The alarms and events can be apportioned to:

- alarm and event lists
- alarm and event logs on printers
- external alarm devices.

In this way the operators will not be distracted by alarms and events taking place outside their own area of responsibility, allowing them to concentrate on their own duties.

Different operator authorities, such as inspect only, warning, and full authority, can be defined for the different sections. In connection with attempts to select objects for control or acknowledge alarms, the system checks whether the operator has the required authority.

The operators are able to control and affect their own process section, but are also able to obtain information about the course of alarms and events in other sections.



1998-03-14 13:29

Fixed Display

Process Sectioning Configuration

Help

Day shift ACTIVE

Alarms & Events Stored	Alarms & Events Displayed	Section No	Section Name	Restriction in Operation	Printer 1	Printer 2	Printer 3	External Alarm Enabled
☑	☑	1	Chip Boiler	☐	E	☐	☐	☑
☑	☑	2	Digester	P	☐	☐	☐	☐
☑	☐	3	Prescreening	☐	☐	☐	☐	☐
☐	☐	4		☐	☐	☐	☐	☐
☐	☐	5		☐	☐	☐	☐	☐
☐	☐	6		☐	☐	☐	☐	☐
☐	☐	7		☐	☐	☐	☐	☐
☐	☐	8		☐	☐	☐	☐	☐
☐	☐	9		☐	☐	☐	☐	☐
☐	☐	10		☐	☐	☐	☐	☐
☐	☐	11		☐	☐	☐	☐	☐
☐	☐	12		☐	☐	☐	☐	☐
☐	☐	13		☐	☐	☐	☐	☐
☐	☐	14		☐	☐	☐	☐	☐
☐	☐	15		☐	☐	☐	☐	☐
☐	☐	16		☐	☐	☐	☐	☐
☑	☑		System Alarms		☐	☐	☐	☐

Restriction codes
“ ” - No restrictions
“W” - Warning
“P” - Protected

Printer codes
“E” - Events
“A” - Alarm

Delegation Identity
☑ DO1
☐ DO2
☐ DO3

Printer Connection

Printer 1	Line
Printer 2	Line
Printer 3	Not connected
List Printout	Not connected

Figure 4-14. Configuration display for Process Sectioning

Alarms and events from the control system itself are treated as an ever-present section. This section has its own alarm list and outputs can be directed to printers and external alarm devices. No authority control is provided for system alarms and events.

The sectioning is used as:

- selection criterion when presenting alarm and event messages on the screen
- selection criterion for logging alarm and event messages on printers
- selection criterion when outputting alarm information to external alarm equipment
- information for authority checking at operator selection (and control) of objects
- information for authority checking at operator acknowledgment of process alarms.

The AdvaCommand Process Sectioning must be included in each operator station where process sectioning is used. Without this option, the user has full access to all objects, regardless of section defined for each object.

4.8 AdvaCommand Status List

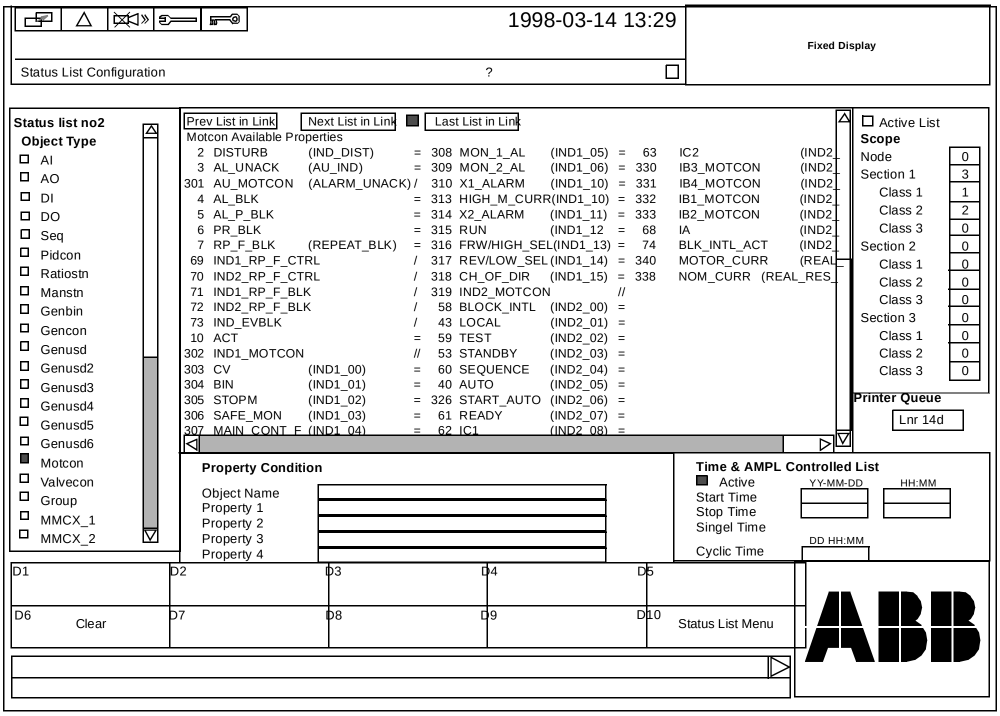
A Status List is a list of process signals and objects matching search parameters supplied by the operator. Consequently, status lists are used to find those objects that are in a certain state or have something in common.

There are lists for both temporary use - with new search keys every time - and for recurring use - with permanent search keys.

There are three types of lists:

- A quick list, one per display screen, which is intended for occasional use, for example, during commissioning, for display of the status of certain signals and objects.
- user-defined, primary lists which are intended for repetitive use. These lists are selected from a Status List Menu.
- user-defined, secondary lists which have to be linked to primary lists.

Up to three secondary lists can be attached to each primary list. When a primary list is called up, its secondary lists will be shown following the primary one, using the Page Right key.



Status list no2

Object Type

- ☐ AI
- ☐ AO
- ☐ DI
- ☐ DO
- ☐ Seq
- ☐ Pidcon
- ☐ Ratiostn
- ☐ Manstn
- ☐ Genbin
- ☐ Gencon
- ☐ Genusd
- ☐ Genusd2
- ☐ Genusd3
- ☐ Genusd4
- ☐ Genusd5
- ☐ Genusd6
- ■ Motcon
- ☐ Valvecon
- ☐ Group
- ☐ MMCX_1
- ☐ MMCX_2

Motcon Available Properties

```
  2 DISTURB      (IND_DIST)      =  308 MON_1_AL     (IND1_05) =   63  IC2          (IND2_
  3 AL_UNACK     (AU_IND)        =  309 MON_2_AL     (IND1_06) =  330  IB3_MOTCON   (IND2_
301 AU_MOTCON    (ALARM_UNACK)   /  310 X1_ALARM     (IND1_10) =  331  IB4_MOTCON   (IND2_
  4 AL_BLK                       =  313 HIGH_M_CURR(IND1_10)   =  332  IB1_MOTCON   (IND2_
  5 AL_P_BLK                     =  314 X2_ALARM     (IND1_11) =  333  IB2_MOTCON   (IND2_
  6 PR_BLK                       =  315 RUN          (IND1_12  =   68  IA           (IND2_
  7 RP_F_BLK     (REPEAT_BLK)    =  316 FRW/HIGH_SEL(IND1_13)  =   74  BLK_INTL_ACT (IND2_
 69 IND1_RP_F_CTRL               /  317 REV/LOW_SEL (IND1_14)  =  340  MOTOR_CURR   (REAL_
 70 IND2_RP_F_CTRL               /  318 CH_OF_DIR    (IND1_15) =  338  NOM_CURR  (REAL_RES_
 71 IND1_RP_F_BLK                /  319 IND2_MOTCON            //
 72 IND2_RP_F_BLK                /   58 BLOCK_INTL   (IND2_00) =
 73 IND_EVBLK                    /   43 LOCAL        (IND2_01) =
 10 ACT                          =   59 TEST         (IND2_02) =
302 IND1_MOTCON                  //  53 STANDBY      (IND2_03) =
303 CV           (IND1_00)       =   60 SEQUENCE     (IND2_04) =
304 BIN          (IND1_01)       =   40 AUTO         (IND2_05) =
305 STOPM        (IND1_02)       =  326 START_AUTO   (IND2_06) =
306 SAFE_MON     (IND1_03)       =   61 READY        (IND2_07) =
307 MAIN_CONT_F  (IND1_04)       =   62 IC1          (IND2_08) =
```

☐ Active List

Scope

Node	0
Section 1	3
Class 1	1
Class 2	2
Class 3	0
Section 2	0
Class 1	0
Class 2	0
Class 3	0
Section 3	0
Class 1	0
Class 2	0
Class 3	0

Printer Queue

Lnr 14d

Property Condition

Object Name
Property 1
Property 2
Property 3
Property 4

Time & AMPL Controlled List

■ Active

	YY-MM-DD	HH:MM
Start Time		
Stop Time		
Singel Time		
Cyclic Time	DD HH:MM	

Figure 4-15. Configuration display for a Status List where MOTCON is activated

The criteria for inclusion of signals in a list, is specified on the configuration display of the list concerned. The following search conditions can be defined:

- One or several object types
- Tag name, including wild cards
- Value or status for up to four arbitrary properties, parameters or values, in the database.
- Node identity
- Process sections
- Object classes.

Each signal or object satisfying the search conditions will appear on the list.

All lists can be output either to a display terminal or to a printer. Printer output of the primary and secondary lists can also be initiated automatically at specified times, or by AMPL programs in the process stations providing a simple, yet powerful, report facility.

For up to 10 lists, cyclic searching can be employed. If there is at least one signal in the list which satisfies the search conditions, this will be indicated on the status list menu display. This indication can also be configured to activate a digital output in a process station, or be indicated on a process display.

When requesting printout, it is possible to list the search conditions in the header.

A few examples of usage of the status list function:

- Listing of all blocked input signals
- Summary of all objects with unacknowledged alarms
- Listing of all controllers with control deviations exceeding 10%.

The AdvaCommand Status List option must be included in each station, where this feature is requested.

4.9 AdvaCommand Safeguard

All AdvaCommand for Windows NT functions are retained when used with the Safeguard 400 Series. The product can be used as a common operator workplace for safety and process control.

NOTE

The operator workplace can not be used in a plant network.

AdvaCommand Safeguard Handler adds the following functions to the basic operator workplace:

- A dual system handler that allows both branches of the Safeguard 400 Series to appear as one object to the operator. This gives:
  - Single presentation of alarms in lists and on printer.
  - Single presentation of objects.
  - Dialog handler with commands sent to both branches.

- Presentations for safety objects such as detectors and protection systems, including:
  - Signal (On/Off or Value)
  - Alarm limits and alarms
  - Object status (inhibit, bypass, latched alarm, selected for operation etc.)
  - Loop and I/O diagnostics.
  - Maintenance.
- Dialog handlers with safety system functions, such as inhibit, alarm latching, bypass and calibration.
  - Activation and manual entry.
  - Control of status (for example inhibit, reset).
- Diagnostic and status functions.
  - Alarm/Event list.
  - Group alarm (option).
  - Status list (report special status and conditions).
  - System alarm list and diagnostic displays.
- Signal Filtering function for filtering the events, alarms, system alarms and system status in the operator workplace to reduce system load in an individual controller if necessary.

Standard operator workplace displays such as object displays, group displays and diagnostic displays are extended with types required by the Safeguard 400 Series.

The following safety object/group displays are available in the Safeguard Handler:

- FI, for Fire Input signals
- FD, for addressable Fire Detector signals
- GI, for non addressable and addressable Gas Detector signals
- Safety System Status, diagnostic status display for Safeguard 400 Series
- FG, diagnostic status display for Fireguard
- GG, diagnostic status display for Gasguard
- C&E shutdown level group display.

4.10 AdvaBuild Display Builder

AdvaBuild Display Builder is a menu-driven, interactive utility program that you use to plan and design custom graphic displays in the AdvaCommand for Windows NT. The Display Builder is available for purchase as an option for AdvaCommand for Windows NT.

The Display Builder provides the added flexibility of creating your own custom displays. Such user-generated displays are especially helpful in tailoring graphic information to meet particular industry needs in a specific process environment. A well-designed display can minimize operating errors, more clearly illustrate and define critical process control parameters, and reduce training time for new operators.

There are a lot of facilities for making displays more user friendly. For more information about designing display, see for example *The Computer Display Designer's Handbook*.

- Using of uniform color coding.
- Arranging of symbols to show the flow of energy, material and data in a consistent manner, for example, left to right, top to bottom, etc.
- Differentiating of equipment outlines and piping lines by color or width.
- Designing of process symbols to represent the process in the most effective way.
- Showing only the symbols important to the operator's understanding of the process.
- Numeric values and text makes the display more understandable and comprehensive.
- Placing of arrows judiciously in process lines to indicate the direction of the flow.

4.11 AdvaBuild On-line Builder

On-line Builder is the tool for configuration, commissioning, and testing applications for Advant Controller 400 Series, MasterGate 230/1 and Advant Operator Workplace. Basic Functions are:

- Selection of target system
- Command file handling
- Symbol handling
- Performance analysis
- Backup and restore of application data

AMPL source code editing and handling

For Advant Controller 400 Series configuration and programming includes the following functions:

- Dimensioning of database and AMPL program areas
- Database population
- Application program entry, editing, and on-line modification of AMPL programs during program execution
- Application program and process database documentation, in graphic or list form

- Source code loading and dumping of application programs and database contents
- Testing and fault tracing
- Dynamic display of variables; display and modification of parameters
- Forcing of inputs and outputs
- Reading/setting of date and time.

For Advant Operator Workplace Configuration the following functions are included:

- Database handling, including configuration
- Fault tracing.

For MasterGate 230/1 Configuration the following functions are included:

- Database handling.

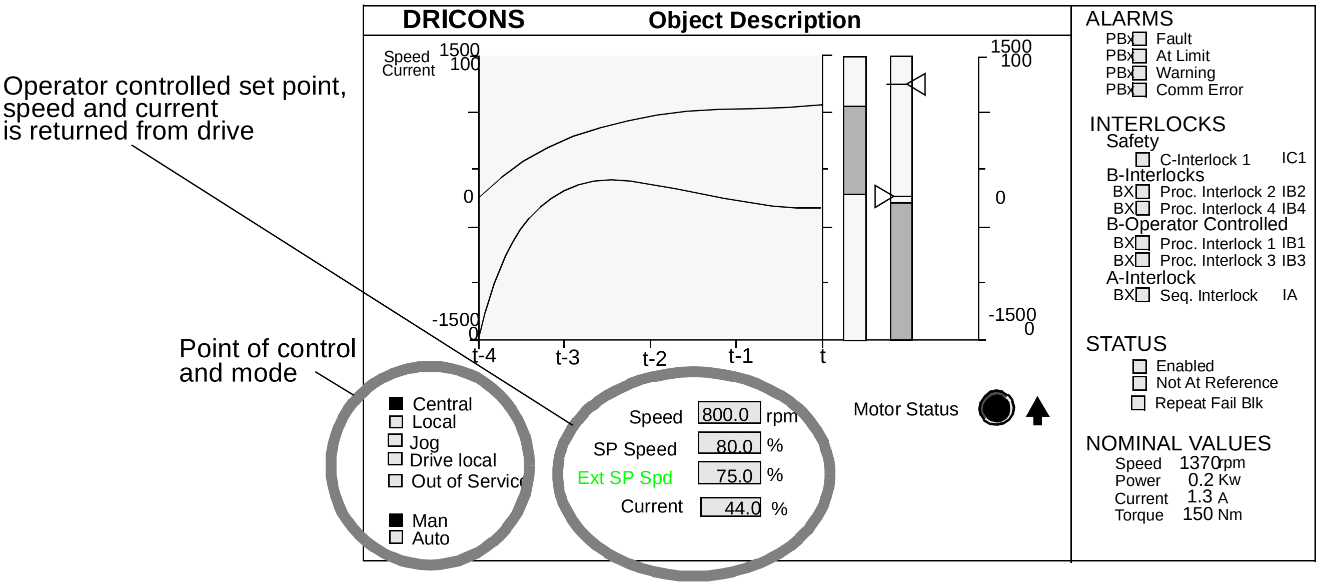
For Network Management Services the following functions are included:

- testing, maintenance and fault tracing in ABB MasterNet networks.

4.12 AdvaCommand Drive Integration

The Drive integration in AdvaCommand allows the operator to control and supervise motor characteristics; speed, current and torque. You can also give commands to the Drives; for start, stop and fault reset. The function includes Drive specific object, group display elements, dialogs and the possibility to include Drive specific process display element in process displays.

Faults and alarms from the Drive are handled by the AdvaCommand Alarm and Event function in the same way as for all other process objects. Speed, current and torque are attributes which can be logged in trend displays. An example of a Drive object display is shown in Figure 4-16.



■ Central
☐ Local
☐ Jog
☐ Drive local
☐ Out of Service

■ Man
☐ Auto

Speed 800.0 rpm
SP Speed 80.0 %
Ext SP Spd 75.0 %
Current 44.0 %

NOMINAL VALUES
Speed 1370 rpm
Power 0.2 Kw
Current 1.3 A
Torque 150 Nm

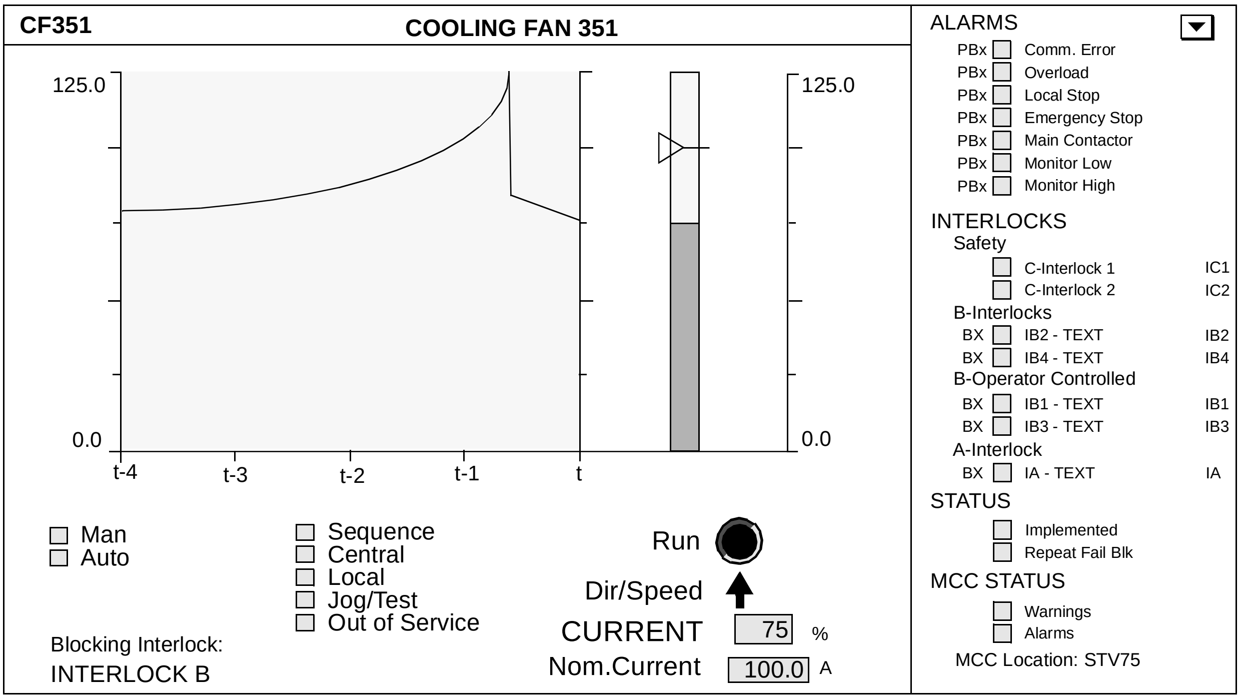
Operator controlled set point, speed and current is returned from drive

Point of control and mode

Figure 4-16. Drive object display with speed and current as actual values from Drive

4.13 AdvaCommand for Switchgear Integration

The Switchgear integration in AdvaCommand allows the operator to control and supervise a fixed speed motor connected to the INSUM (Intergrated System for User-optimized Motor Management) Motor Controller Unit (MCU) via the LONWORKS Network. Commands can also be given to the MCU for start, stop and fault reset. The functional unit MOTCONI is used as an interface to the MCU. The MOTCONI functional unit includes MCU specific object and group display elements and dialogs. MOTCONI also have specific process display element for process displays. Warnings, alarms and events from the MCU are handled by the AdvaCommand Alarm and Event function in the same way as all other process objects. As an example of a MOTCONI object display is shown in Figure 4-17.



Blocking Interlock:
INTERLOCK B

CURRENT 75 %
Nom.Current 100.0 A

MCC Location: STV75

Figure 4-17. MOTCONI object display

Chapter 5 Hardware Description

5.1 PC Workstation Hardware

5.1.1 PC with AdvaCommand for Windows NT as Operator Workplace

An operator workplace consists of one or two monitors and the following interaction devices, QWERTY standard PC workstation keyboard and mouse connected to the PC workstation. The operator specific button functions are handled with the mouse via button menus on the screen. A DAT unit for loading and taking backup is used for one or several operator workplaces. The DAT unit may be common for one or several operator workplaces.

The external alarm unit is based on an audible card placed in the system unit, to which a loudspeaker can be connected. The external alarm unit is pre-programmed and controlled by parameters from the operator workplace. External alarm can also be sent out via digital outputs in an Advant Controller.

We strongly recommended that some means of uninterruptible power supply (UPS) is provided for the PC workstation. If this is not cared for centrally, an uninterruptible power supply (UPS) is available as an option, see *Product Guide Advant OCS with Master software, Overview.*

Figure 5-1. Advant Operator Workplace

5.1.2 PC Hardware for AdvaCommand for Windows NT

Hardware for AdvaCommand for Windows NT shall be a powerful PC workstation for Windows NT that combine real-time performance with open system technology. The PC workstation hardware forms a base for the operator workplace.

NOTE

If other PC Workstations than by ABB recommended are used, the responsibility for functionality and warranty lies within the user of this equipment.

The PC models we recommend, from certain vendors, for AdvaCommand for Windows NT are based on PCs available on the market. They should be equipped with a real-time accelerator board including an optional, redundant interface for connection to MasterBus 300/300E.

NOTE

> For continuously updated information on which PC workstation we recommend, please contact your local ABB Sales department

An optional DAT-unit is used to backup and restore the system. Several stations can share the same unit. Figure 5-2 shows a simplified overall system block diagram for a PC workstation.

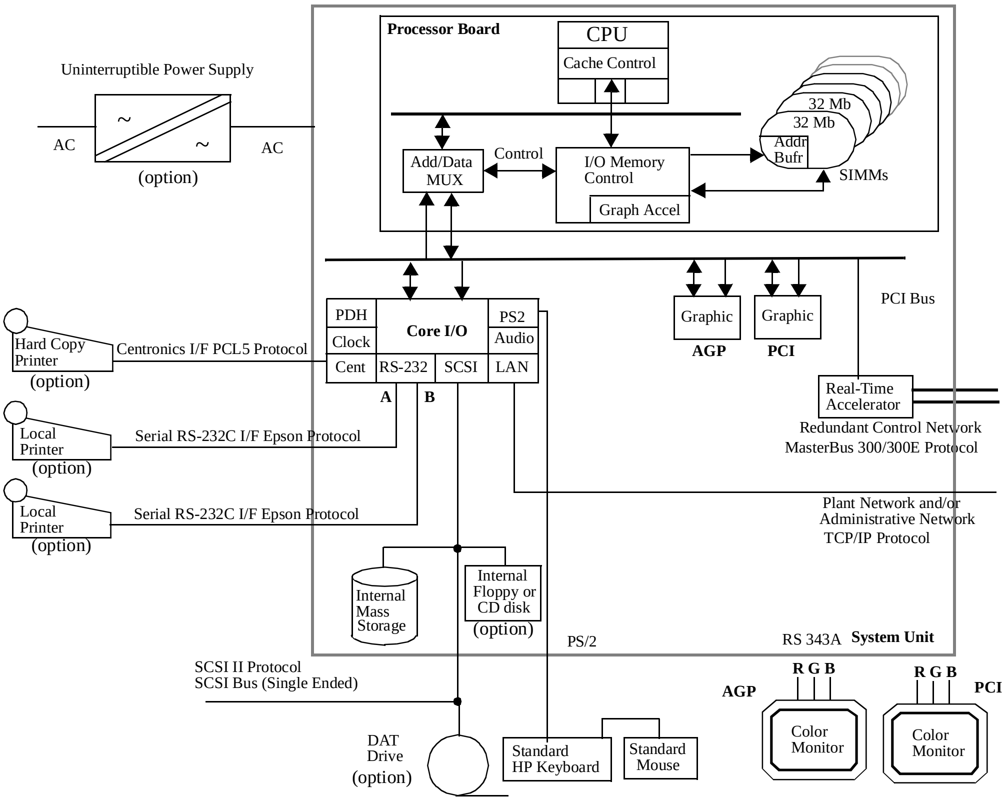


Figure 5-2. A Simplified overall system block diagram for a PC workstation

Requirements on the PC Workstation

The operating system must be the US English version of Windows NT.

The system unit must have a processor with clock frequency 200 MHz or higher. It must have at least 64 Mbyte primary memory RAM, a 2 Gbyte hard disk, minimum, and a CD-ROM drive. The RAM shall then be extended above 64 Mbyte according to the information in the price list.

A slot for the RTA board (PCI) is needed. If a tape unit is used e.g for station backup, a SCSI port is needed. If two screens are used, one screen shall be connected to the AGP bus and the second screen to the additional PCI Graphic card.

The following standard interfaces should be included:

- One PS/2 keyboard connector for connection of a PS/2 keyboard.
- One PS/2 mouse connector for connection of a PS/2 mouse.
- Two RS-232 interfaces for connection of printers and modems.
- One Centronics (parallel) interface for connection of one hard copy or document printer.
- One fast-wide SCSI-2 (20 Mbyte/s) bus output connector for connection of external SCSI-2 devices.
- IEEE 802.3 Ethernet LAN Interface configured with ThickLAN (AUI connector).
- IEEE 802.3 Ethernet LAN Interface configured with a modular connector for Twisted Pair.

Peripheral equipment is connected to the rear bulkhead of the system unit with a variety of connectors and associated cables.

Packaging

Three different hardware packages are possible:

- The PC workstation in its standard PC desktop enclosure with standard desktop peripherals
- The PC workstation mounted in an ABB small cabinet for kneehole table, RE540, with standard PC desktop peripherals. This cabinet is well suited for use together with the operator table described in *Product Guide Advant OCS with Master software, Overview.*
- The PC workstation mounted in a RM557 cabinet.

The kneehole table cabinet, RE540, has protection class IP21 according to IEC529.

The RM557 cabinet for workstations are available for different environmental conditions, according to the table below.

Table 5-1. Protection degrees for RM557 cabinets

Type	Protection class
Ventilated	IP21
Ventilated, radio-proof (for AC only)	IP21
Tropical	IP41
Sealed	IP54
Sealed with heat exchanger	IP54

For cabinet dimensions and operator workplace table, see *Product Guide Advant OCS with Master software, Overview.*

Uninterruptible Power Supply

The operator workplace **should have** an Un-interruptible Power Supply (UPS) provided. The UPS option, described in *Product Guide Advant OCS with Master software*, *Overview*, have a capacity of minimum 10 minutes and the operator workplace performs a controlled shut down when a few minutes of the capacity remains. A serial connection between the system unit and the UPS and the system status function is used for supervision of the UPS.

NOTE

An uncontrolled shut down, due to, for example, power fail, can result in a complete cold start.

Required Technical Data

Table 5-2. Required technical data for PC workstation

Property	Data
Basic I/O System, BIOS	Possibility to configure a 1 Mbyte “address window” at the memory bus
CPU clock frequency	Min. 200 MHz
Primary memory RAM	Min. 64 Mbyte
Hard disk	Min. 2 Gbyte
CD player	Min. 12x
No. of interaction devices	According to supplier
No. of parallel ports for local hard-copy printers or documentation printers	Min. 1
No. of serial ports for local printers.	Min. 2
Backup Memory (DAT)	4 or 8 Gbyte
LAN connector	IEEE 802.3 Ethernet AUI IEEE 802.3 Ethernet AUI and Twisted Pair
SCSI interface	Single ended or fast wide
Serial interface connector	2 EIA RS-232C, CCITT V.24/V.28 9-pin, male-D-sub, PC standard
Parallel interface connector	Centronics 25 pin, female D-sub PC standard
Standard QWERTY Keyboard	101/102 PS/2
Standard Mouse	2-button mouse, PS/2
Physical dimensions h x w x d mm (inch.)	According to supplier.
Net weight	According to supplier.

Table 5-2. Required technical data for PC workstation (Continued)

Property	**Data**
Power consumption, max.	According to supplier.
Line frequency	47 - 63 Hz

Table 5-3. Protection degrees for some important interaction units

Type	**Protection class**
Standard QWERTY Keyboard	According to supplier
Mouse	According to supplier

Table 5-4. Data on PC workstation monitors

Property	**Data**
Refresh rate	72 - 75 Hz
Resolution	1280 x 1024
Dimension	According to supplier
Net weight	According to supplier
Line voltage (auto ranging)	According to supplier
Maximum current	According to supplier
Line frequency	47-63 Hz
Power consumption, max.	According to supplier
Maximum peak inrush current at turn on.	According to supplier

The distance between the workstation and the monitor is limited (ask the supplier). In case of longer distances, fibre-optic video cables are required.

The distance between the interaction devices, keyboard, mouse and the workstation is limited (ask the supplier).

Hard-copy printers and document printers are connected to the PC workstation via the Centronics parallel port and for distances over 15 m (49 ft.), parallel interface modems are required. AdvaCommand for Windows NT also support network printing.

5.2 Real Time Accelerator Board

AdvaCommand for Windows NT requires a powerful PC workstation for Windows NT that combine real-time performance with open system technology. The PC workstation hardware forms a base for the operator workplace. Requirements for the PC is described in Table 5-2

The by ABB recommended PC models, selected from special vendors, for AdvaCommand for Windows NT are based on standard PC workstations available on the open market. They are equipped with a real-time accelerator board (RTA) including an optionally interface for redundant connection to MasterBus 300/300E.

Figure 5-3. PC with AdvaCommand for Windows NT configured as an operator station

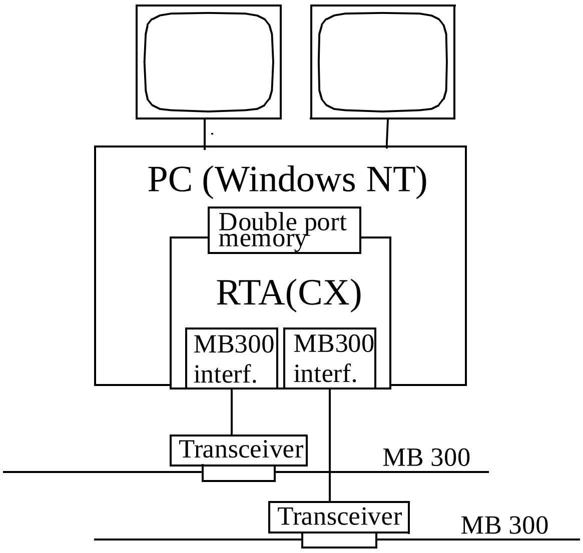


Figure 5-4. Function of the RTA board

A simplified overall system block diagram for a PC workstation is presented in Figure 5-2.

The RTA is a slave processor board with communication and application functions. It consists of a mother board and a communication module mounted on it. It supports the MasterBus 300/300E interface. It also includes an MC68040 processor, 16 Mbytes of parity-checked RAM, control registers, clocks, and connectors.

The on-board software is down-loaded from the hard disk to the RTA board at start up of the AdvaCommand for Windows NT.

The Real Time Accelerator is installed inside the System Unit on the ISA or EISA bus adapter. The communication connectors are available on the rear of the System Unit. The connector ports on the rear of the System Unit are for control network attachments. One of them is used for redundant communication. The control network attachment is used by the RTA. For connection to the MasterBus 300/300E, the PU515 RTA board is connected with a Thick-LAN transceiver cable to the MB300K01 Ethernet transceiver, Figure 5-5.

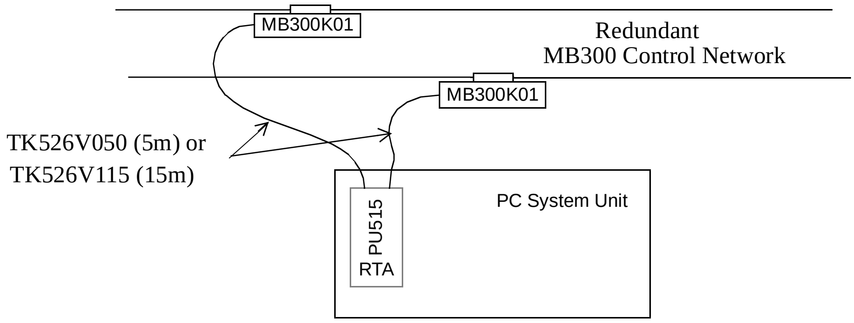


Figure 5-5. Example of a redundant connection to the MB300 Control Network in a PC workstation.

Technical Data

Table 5-5. RTA technical data

Property	Data
Type of bus connection	PCI
No. of MasterBus 300/300E ports	Max. 2
Memory on Real Time Accelerator, RTA board	16 Mbyte

Chapter 6 Technical Data and Performance

6.1 Technical Data

Table 6-1. Technical Data

Performance	PC workstation with AdvaCommand for Windows NT
No. of monitors	Max. 2
No. of local hard-copy printers	Max. 1
No. of local alarm & event printers	Max. 2 (if the 2nd. serial port is not used for other purpose)
No. of MasterBus 300/300E ports	Max. 2
No. of process displays	Limited by available memory (RAM and hard disk)
No. of object displays	Equal to the No. of objects in the system
No. of trend displays	Limited by available memory (RAM and hard disk)
Max no. of tags(1) (objects)	Limited by licence or available memory (RAM and hard disk)
No. of colors	133 different colors simultaneously
No. of overlapping displays	10
No. of dynamic points per display	Limited by performance
Presentation of Trend curves - time ranges and resolution	Depending on the configured sampling interval and time range in concerned Information Management Workplace or AC 400 Series
Event list length	1000 events
Alarm list length	500 alarms
System alarm list length	100 alarms
No. of external alarm outputs	1 audio and 12 (+12) digital outputs in AC400
Dynamic display updating (2)	Cyclically (1) (3), 3, or 9 s and on demand or event driven
Primary memory RAM	Min. 64 Mbyte
Hard disk capacity	Min. 2 Gbyte
Backup Memory (DAT)	4 Gbyte

(1) A tag is a symbolic name of an object in the Advant OCS. The symbolic name is used to establish communication with other objects. An object can reside in any Advant OCS node. The tag, or object is resolved in the object reference list. An object referred to from several displays only occupy one tag. The number of resolved tags can be found by using the Object Reference tool.

(2) Only in activated process display.

(3) Should be used restrictively, due to performance reasons. Requires special configuration of software.

Table 6-2. Printer protocols supported in the operator workplace

Component	**Emulations/protocols**				**Component**
	IBM Pro-Printer	**Post-script**	**HP PLC5**	**EPSON FX**	
Hardcopy	–	–	yes	–	Hardcopy
AdvaCommand Alarm&Event printout	yes	–	–	–	AdvaCommand Alarm&Event printout
AdvaBuild On-line Builder	–	yes	–	yes	AdvaBuild On-line Builder
Display Printout	–	yes	–	–	Display Printout

The printers support the following emulations/protocols:

Table 6-3. Printer Emulations/Protocols

Component	**Emulations/protocols**					
	EPSON FX	**IBM Pro-Printer**	**IBM Graphic**	**Post-script**	**HP PCL5**	**HP PCL6**
EP537 EP538	yes yes	yes yes	yes yes	– –	– –	- -
EP539 EP540	yes yes	yes yes	– –	– –	– –	- -
HP LaserJet 8000 - EP526/EP527	–	–	–	yes	yes	yes
HP LaserJet 4000 - EP528/EP529	–	–	–	yes	no	yes
Lexmark Optra Color 45, EP515	–	–	–	yes	yes	-
IBM PC	–	yes	–	–	–	-
Mannesman-Tally	yes	yes	yes			

6.2 Performance

The performance given below for the AdvaCommand for Windows NT product is based on the conditions that no other software is executing at the same time in the PC where the AdvaCommand for Windows NT software is executing.

Display Exchange Performance

AdvaCommand gives you a wide flexibility in designing displays; what information to present in which way. Therefore display exchange performance varies a lot depending on CPU performance, update time for dynamic points, number and type of dynamic points, size of the display's static part, etc. The following figures illustrate the performance for various parameters.

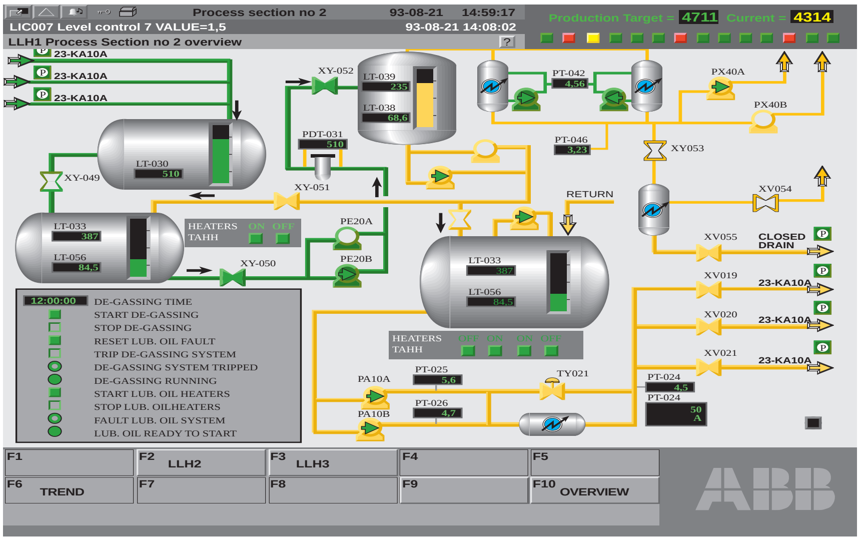


Figure 6-1. Example of a static display of approximately 200 Kbyte size

The display above is an example of a "typical process display". If display elements for small trend curves are used in a process display the display exchange time is longer than indicated in Figure 6-2.

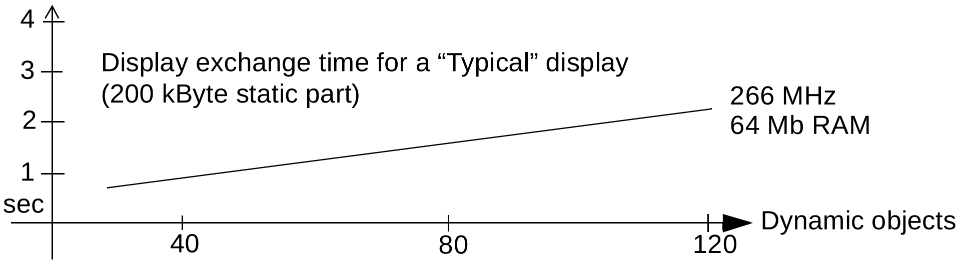


Figure 6-2. The display exchange time dependent on static part size, number of dynamic objects, CPU clock frequency and RAM

Example:

For a “typical process display” with a static part of approximately 200 Kbyte, 100 dynamic objects and a CPU with a clock frequency of 266 MHz and 64 Mbyte RAM, the display exchange time will be approximately 2 s, if all objects exist within the same control network. If process objects from other control networks are included in the display, the display exchange time will increase slightly.

Presentation of a dynamic object can consist of more information than just the value. A dynamic object can have a number of attributes that are presented in a process display.

Table 6-4. Performance

Parameters	**PC workstation with AdvaCommand for Windows NT**
Display exchange time	See Display Exchange Performanceon page 4-3
Indication propagation time	< 1 s
Command propagation time	Typically 1 s
Command-to-indication time	Typically 2s
Screen lock-up at hard copy	Typically 2 s
Event message rate	1 message/s
Resolution, event & alarm lists	1 ms
Timing accuracy, alarm and event lists - between Controllers with external clock synch. and within a control network - between Controllers with clock synch. via MasterBus 300/300E and within a control network - within same Controller	 ≤3 ms ≤ 4ms, typically 3 ms (requires Advant Controller 400 Series) ≤2 ms

Chapter 7 Environmental Immunities

The immunity of Advant OCS to environmental factors is summarized in *Product Guide Advant OCS with Master SW, Overview.*

The Advant OCS system has been designed to withstand the environments encountered in the power and process industries with respect to climatic, mechanical and electrical effects.

Products in the Advant OCS range, manufactured by ABB or others, are normally type tested or evaluated to ensure compliance with the environmental requirements specified below.

These requirements can be categorized as follows:

- Resistance to the external environment outside enclosures (including corrosive gases)
- Resistance to the environment inside enclosures
- Electro Magnetic Compatibility
- Electrical safety.

The environmental specifications applicable to third party equipments, for example, PC:s and printers, may differ. Refer to the data sheets of the products concerned.

The degree to which the units withstand environmental influence depends on their components and their design. The system enclosures, the types of cable and how these are routed determine the environmental requirements of the complete system.

Chapter 8 Ordering

8.1 System Parts, Licence and Software

8.1.1 System Parts

AdvaCommand ver. 1.7 for Windows NT - Licenses

Table 8-1. AdvaCommand Basic Software

Description	Consists of	Article No.
AdvaCommand for up to 400 tags Operator workplace basic software		3BSE015777R1
Tag Addition for AdvaCommand from 401 tags up to 800 tags		3BSE015480R1
Tag Addition for AdvaCommand from 801 tags up to 1.600 tags		3BSE015481R1
Tag Addition for AdvaCommand from 1.601(1) tags up to 3.200 tags		3BSE015482R1
Tag Addition for AdvaCommand from 3.201**(1)** tags up to unlimited number of tags		3BSE015483R1

(1) We strongly recommend an addition of 16 Mbyte RAM to keep good performance

8.1.2 Software Options - Licenses

AdvaCommand

Table 8-2. AdvaCommand Software Options

Description	Article No.
AdvaCommand Process Sectioning	3BSE015484R1
AdvaCommand Status List	3BSE015485R1
AdvaCommand for Drives Integration	3BSE016675R1
AdvaCommand for Switchgear Integration	3BSE020799R1

AdvaBuild

Table 8-3. AdvaBuild Software Options

Description	Article No.
AdvaBuild Display Builder	3BSE015486R1
AdvaBuild On-line Builder*2.7	3BSE020798R1

AdvaCommand for Advant Safety System

Table 8-4. AdvaCommand Software Options

Description	Article No.
AdvaCommand Safeguard Handler for use with Safeguard 400 Series	3BNP004001R1

8.1.3 AdvaCommand ver. 1.7 for Windows NT - Media

Table 8-5. AdvaCommand Media

Description	Consists of	Article No.
AdvaCommand for Windows NT Delivering media, Compact Disk (CD)		3BSE019432R1
AdvaCommand for Windows NT- options Delivering media, Compact Disk (CD)	On-line Builder 2.7 and AdvaCommand for Switchgear Integration.(1)	3BSE020817R1

(1) These two options for AdvaCommand for Windows NT version 1.7/1 are delivered on a separate CD since they were released after the release of 1.7/1.

8.1.4 AdvaCommand ver. 1.7 for Windows NT - update to latest revision

Table 8-6. AdvaCommand Media

Description	Consists of	Article No.
AdvaCommand for Windows NT ver. 1.7/x - Update to latest revision		3BSE019431R1

8.2 Hardware Options

8.2.1 Communication

Communication MB300/300E

Table 8-7. Communication MB300/300E

Description	Consists of	Article No.
Transceiver kit for one MasterBus 300/300E, GCOM or TCP/IP communication	MB300K01	5730 030-VN
Toolkit for transceiver installation	MB300K02	5751 029-2
AUI cable for connection of the RTA board to transceiver 5 m (16 ft.)	TK526V050	3BSC950022R5
AUI cable for connection of the RTA board to transceiver 15 m (49 ft.)	TK526V115	3BSC950022R15

TCP/IP Network Connection

Table 8-8. TCP/IP Network Connection (1)

Description	Consists of	Article No.
Transceiver set for one MasterBus 300/300E, GCOM or TCP/IP communication	MB300K01	5730 030-VN
Toolkit for MB300K1 transceiver installation	MB300K02	5751 029-2
Transceiver adaptor for thin LAN with BNC T-cross, 50 Ohm. To be installed on the MB300K01 set	TX501	5217 423-24

(1) For longer distances, industrial environment or connection to plant network thickwire Ethernet is required.

Cables and Accessories for ThickLAN

Table 8-9. Cables and Accessories for ThickLAN

Description	Consists of	Article No.
Coaxial Cable, L=23.4 m (77 ft.) for MB300, GCOM or TCP/IP	COAX K8	2639 0799-A
Coaxial Cable, L=70.2 m (231 ft.) for MB300, GCOM or TCP/IP	COAX K9	2639 0799-C
Coaxial Cable, L=117.0 m (385 ft.) for MB300, GCOM or TCP/IP	COAX K10	2639 0799-E
In-line type N Connector for MB300, GCOM or TCP/IP	COAX K11	5217 423-19
Line Terminator Set for MB300, GCOM or TCP/IP	COAX K12	5730 030-HY

Cables and Accessories for ThinLAN

Table 8-10. Cables and Accessories for ThinLAN

Description	Consists of	Article No.
C/U Coaxial Cable 50 Ohm, for TCP/IP, per m	RG58	1689 0033-5
BNC Connector 50 Ohm, for TCP/IP	RG58K01	5217 423-22
Coaxial Terminator 50 Ohm, for TCP/IP	RG58K02	5217 423-23

Printers

Table 8-11. Printers

Description	Consists of	Article No.
Matrix printer, narrow (A4, ANSI A). Black ribbon, alpha-numeric/graphic.With 9-pin printhead. IBM Proprinter and Epson emulations. Fastest draft (at10cpi) 360 characters per second (cps). Power 120 V. 3 m serial RS-232 cable included.	EP537	3BSC630116R1
Matrix printer, narrow (A4, ANSI A). Black ribbon, alpha-numeric/graphic.With 9-pin printhead. IBM Proprinter and Epson emulations. Fastest draft (at10cpi) 360 characters per second (cps). Power 230 V. 3 m serial RS-232 cable included.	EP538	3BSC630117R1
Matrix printer, wide (A3) Black ribbon, alpha-numeric/graphic.With 24-pin printhead. IBM Proprinter and Epson emulations. Fastest draft (at10cpi) 330 characters per second (cps). Power 120 V. 3 m serial RS-232 cable included.	EP539	3BSC630118R1
Matrix printer, wide (A3) Black ribbon, alpha-numeric/graphic.With 24-pin printhead. IBM Proprinter and Epson emulations. Fastest draft (at10cpi) 330 characters per second (cps). Power 230 V. 3 m serial RS-232 cable included.	EP540	3BSC630119R1
Cable assembly RS-232 extension cable 15 m (49 ft.) for printers EP532/533 and EP530/531	TK524V115	3BSC950024R1
Short Distance Modem, 120/230 V a.c, switch selectable. For cable length 15-300m (49-984 ft.)	DSTC X008	5751 030-1
Ribbon cable for connection of printers, EP532 or 533 and EP530/531, to modem DSTC X008, 0.5 m (19.6”.)	DSTK 156V0.5	2639 0638-A

Table 8-11. Printers (Continued)

Description	Consists of	Article No.
Color inkjet printer, A4, HP DeskJet 2500CM. Includes PCL5 and Postscript protocols. 12 MByte RAM. Resolution 600x600dpi b/w, 300x300 color, 12.000 pages per month. Interfaces: ECP two-way parallel port. 10BaseT (Twisted Pair), 10Base2 (BNC), and parallel. Hardcopy printout time 2 minutes. 2m centronix parallel cable included.	EP515K01	3BSC630151R1
Color inkjet printer, A4, Lexmark Optra-Color 45. Includes PCL5 and Postscript protocols. 16 MByte RAM. Resolution 600x600dpi, 5000 pages per month, parallel interface, hardcopy printout time 8 minutes. 2m centronix parallel cable included.	EP515K01	3BSE019503R1
Cable assembly parallel extension cable 15 m (49 ft.) for printers EP510/511	TK541V115	3BSC950036R15
External print Server. TCP/IP interface for printer EP514K01. With 120/230V 50/60 Hz external power supply.With 10BaseT (Twisted pair) and 10Base2 (BNC) network connectors. DB25 printer connector.	EP505	3BSC630141R1

For technical data, please refer to *Product Guide Advant OCS with Master SW, Overview.*

Power System

Table 8-12. Power System

Description	Consists of	Article No.
Power distribution unit, 6 cables incl.	SX520K01	3BSE001691R1
Uninterruptible Power Supply (UPS) minimum 10 minutes, input 120 V a.c., output 1000 VA / 700 W (1)	SV530	3BSC610032R1
Uninterruptible Power Supply (UPS) minimum 10 minutes, input 230 V a.c., output 1000 VA / 700 W [1]	SV531	3BSC610033R1
External bypass switch for UPS 120 Vac	SX521	3BSC820051R1

Table 8-12. Power System (Continued)

Description	Consists of	Article No.
External bypass switch for UPS 230 Vac	SX522	3BSC820052R1
Cable assembly RS-232 15m (49 ft.) for connection of UPS to System Unit. DE9 pin - DE9 socket	TK621V115	3BSC950134R1

(1) Output voltage selectable, 120 or 230 V a.c.

Data storage

Table 8-13. Tape Unit for PC

Description	Consists of	Article No.
Tape unit, 8 Gbytes (DAT) SCSI interface external with cabinet	MT516	3BSE016474R1
Tape package with 5 pcs 2 Gbyte tapes	MT501	3BSE018353R1

8.3 Packaging Options

Table 8-14. Packaging Options

Description	Consists of	Article No.
Operator table with manual hight adjustment, 700-1090 mm (28-43”)	RE550	3BSC930007R1
Operator table with mechanic parallel hight control, 115 V a.c. alt 230 V a.c., 700-1090 mm (28-43”)	RE551	3BSC930008R1
Operator table with electrical parallel hight control 115 V a.c. alt 230 V a.c., 700-1090 mm (28-43”)	RE552	3BSC930009R1
Extension table pie 45 degrees. To be mounted on (both sides possible) RE550/551/552 Operator tables	RE553	3BSC930010R1
Monitor mounting bracket. Monitor shelf to be mounted on RE550/551/552 Operator tables	RE554	3BSC930011R1
RE540 Cabinet for mounting of PC. Small cabinet for dust protection of the system unit. With dust filter. Can be placed under operator tables. Protection class IP21	RE540	3BSC930006R1
Cover for RE540 cabinet with two fans for extra cooling if needed. 120 - 230 V ac.	RE501	3BSE014218R1

Table 8-14. Packaging Options (Continued)

Description	Consists of	Article No.
RM557 cabinet for mounting of PCs. Large cabinet for dust protection of Advant OCS. Can house System Units, External Mass Storage, UPS. With filters. Protection class IP21.	RM557	3BSE017134R1
Power distribution Kit, for power distribution in RM557 cabinet. Mounting included		3BSE009179R1

8.4 User Documentation

Table 8-15. Documentation on AdvaCommand for Windows NT

Title	Description	Article No.
Advant OCS User Documentation on CD-ROM	All Advant OCS user documentation on a CD-ROM disk	3BSE008143R1001
World Wide Web Access to Advant OCS Documentation One year, single user subscription	Access to all Advant OCS User Documentation	3BUR001228R0001
World Wide Web Access to Advant OCS Documentation One year, 5 user’s license subscription	Access to all Advant OCS User Documentation	3BUR001503R0001
ABB Master Installation Rules	A description on the installation rules for Advant OCS, to ensure correct function in environments where such disturbances are present.	3BSE009178R101
Interference-free electronics	Philosophy, theory design and applications of EMC on equipment and systems. Valid for ABB industrial automation systems	3BSE000877R0001
MasterNet User’s Guide	How to configure, install and maintain MasterNet communication networks; MB200/300/300E. For information on MG230/1, see the manuals concerned	3BSE003839R0201
AdvaCommand for Windows NT Hardware User’s Guide	Reference Manual for hardware requirements and installation of PC workstation	3BSE015822R0001

Table 8-15. Documentation on AdvaCommand for Windows NT

Title	Description	Article No.
AdvaCommand User Interface Reference Manual	Reference manual for AdvaCommand User Interface	3BSE001962R0201
AdvaBuild On-line Builder	Reference manual describing all common commands used in AS 100ES, AS 500ES, AS 500OS and ACfWNT	3BSE001974R0601
AdvaCommand for Windows NT Basic Functions	User´s guide for Basic Functions, including User Interface, Alarm and Event, and System Status	3BSE015820R0001
AdvaCommand for Windows NT Localization	User´s guide for AdvaCommand Localization. Native Language Support (NLS)	3BSE015821R0001
AdvaCommand Process Sectioning	User´s guide for AdvaCommand Process Sectioning	3BSE001963R0201
AdvaCommand Status List	User´s guide for AdvaCommand Status List	3BSE001964R0001
AdvaBuild Display Builder	User´s guide for AdvaBuild Display Builder	3BSE001968R0201
AdvaBuild for Windows Application Builder	User´s guide for AdvaBuild Application Builder for Windows	3BSE007031R0501
Functional Unit Part 1 Common Properties	An introduction to the concept of Functional Units in Advant OCS	3BSE003849R0001
Functional Unit Part 2 AI, AO, DI, DO	Describes the functional units AI, AO, DI, and DO	3BSE003850R0001
Functional Unit Part 3 SEQ, GROUP	Describes the functional units SEQ and GROUP	3BSE003851R0001
Functional Unit Part 4 PIDCON, RATIOSTN, MANSTN	Describes the functional units PIDCON, RATIOSTN, and MANSTN	3BSE003852R0001
Functional Unit Part 5 GENXXX	Describes the functional units GENCON, GENBIN, GENUSD, and GENNOV	3BSE003853R0001
Functional Unit Part 6 MOTCON, VALVECON	Describes the functional units MOTCON and VALVECON	3BSE003854R0001
Functional Unit Part 7 PIDCONA	Describes the functional unit PIDCONA	3BSE002433R0001

Table 8-15. Documentation on AdvaCommand for Windows NT

Title	Description	Article No.
Functional Unit Part 8 DRICONS	Describes the functional unit DRICONS	3BSE012570R0101
Functional Unit Part 9 DRICONE	Describes the functional unit DRICONE	3BSE013947R0001
Functional Unit Part 10 MOTCONI	Describes the functional unit MOTCONI	3BSE018916R101

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3BSE 015 877R201

February 2000